(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
4 August 2005 (04.08.2005)

PCT

(10) International Publication Number
WO 2005/069969 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/US2005/002059

(22) International Filing Date: 21 January 2005 (21.01.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/538,149 21 January 2004 (21.01.2004) US

(71) Applicant *(for all designated States except US)*: **UNIVERSITY OF UTAH RESEARCH FOUNDATION** [US/US]; 615 Arapeen Drive, Suite 110, Salt Lake City, UT 84108 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **LEPPERT, Mark, F.** [US/US]; 1466 Westminster Avenue, Salt Lake City, UT 84105 (US). **SINGH, Nanda, A.** [US/US]; 101 Timberlakes, Heber City, UT 84032 (US).

(74) Agents: **CURFMAN, Christopher, L.** et al.; Needle & Rosenberg, P.C., Suite 1000, 999 Peachtree Street, Atlanta, GA 30309-3915 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: MUTANT SODIUM CHANNEL $NA_V1.7$ AND METHODS RELATED THERETO

(57) Abstract: Described are mutant $Na_v1.7$ sodium channel alpha-subunits and nucleic acid sequences encoding such mutants. Further described are methods for characterizing a nucleic acid sequence that encodes a Na_v1 sodium channel alpha-subunit, methods for determining a $Na_v1.7$ haplotype, methods for determining a subject's predisposition to a neurologic disorder associated with a sodium channel mutation, and methods of identifying a compound that modulates mutant $Na_v1.7$ sodium channels. Other materials, compositions, articles, devices, and methods relating to mutant $Na_v1.7$ sodium channels are also described herein.

WO 2005/069969 A2

SEQUENCE LISTING

<110> Leppert, Mark F.
Singh, Nanda A.

<120> Mutant Sodium Channel Nav1.7 and Methods Related Thereto

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1635 1640 1645
Ile Phe Gly Met Ser Asn Phe Ala Tyr Val Lys Lys Glu Asp Gly Ile
1650 1655 1660
Asn Asp Met Phe Asn Phe Glu Thr Phe Gly Asn Ser Met Ile Cys Leu
1665 1670 1675 1680
Phe Gln Ile Thr Thr Ser Ala Gly Trp Asp Gly Leu Leu Ala Pro Ile
1685 1690 1695
Leu Asn Ser Lys Pro Pro Asp Cys Asp Pro Lys Lys Val His Pro Gly
1700 1705 1710
Ser Ser Val Glu Gly Asp Cys Gly Asn Pro Ser Val Gly Ile Phe Tyr
1715 1720 1725
Phe Val Ser Tyr Ile Ile Ile Ser Phe Leu Val Val Val Asn Met Tyr
1730 1735 1740
Ile Ala Val Ile Leu Glu Asn Phe Ser Val Ala Thr Glu Glu Ser Thr
1745 1750 1755 1760
Glu Pro Leu Ser Glu Asp Asp Phe Glu Met Phe Tyr Glu Val Trp Glu
1765 1770 1775
Lys Phe Asp Pro Asp Ala Thr Gln Phe Ile Glu Phe Ser Lys Leu Ser
1780 1785 1790
Asp Phe Ala Ala Ala Leu Asp Pro Pro Leu Leu Ile Ala Lys Pro Asn
1795 1800 1805
Lys Val Gln Leu Ile Ala Met Asp Leu Pro Met Val Ser Gly Asp Arg
1810 1815 1820
Ile His Cys Leu Asp Ile Leu Phe Ala Phe Thr Lys Arg Val Leu Gly
1825 1830 1835 1840
Glu Ser Gly Glu Met Asp Ser Leu Arg Ser Gln Met Glu Glu Arg Phe
1845 1850 1855
Met Ser Ala Asn Pro Ser Lys Val Ser Tyr Glu Pro Ile Thr Thr Thr
1860 1865 1870
Leu Lys Arg Lys Gln Glu Asp Val Ser Ala Thr Val Ile Gln Arg Ala
1875 1880 1885
Tyr Arg Arg Tyr Arg Leu Arg Gln Asn Val Lys Asn Ile Ser Ser Ile
1890 1895 1900
Tyr Ile Lys Asp Gly Asp Arg Asp Asp Asp Leu Leu Asn Lys Lys Asp
1905 1910 1915 1920
Met Ala Phe Asp Asn Val Asn Glu Asn Ser Ser Pro Glu Lys Thr Asp
1925 1930 1935
Ala Thr Ser Ser Thr Thr Ser Pro Pro Ser Tyr Asp Ser Val Thr Lys
1940 1945 1950
Pro Asp Lys Glu Lys Tyr Glu Gln Asp Arg Thr Glu Lys Glu Asp Lys
1955 1960 1965
Gly Lys Asp Ser Lys Glu Ser Lys Lys
1970 1975

<210> 3
<211> 1977
<212> PRT
<213> Homo Sapien

<400> 3

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Met Ala Met Leu Pro Pro Pro Gly Pro Gln Ser Phe Val His Phe Thr
 1               5                  10                  15
Lys Gln Ser Leu Ala Leu Ile Glu Gln Arg Ile Ala Glu Arg Lys Ser
            20                  25                  30
Lys Glu Pro Lys Glu Glu Lys Lys Asp Asp Asp Glu Glu Ala Pro Lys
        35                  40                  45
Pro Ser Ser Asp Leu Glu Ala Gly Lys Gln Leu Pro Phe Ile Tyr Gly
    50                  55                  60
Asp Ile Pro Pro Gly Met Val Ser Glu Pro Leu Glu Asp Leu Asp Pro
65                  70                  75                  80
Tyr Tyr Ala Asp Lys Lys Thr Phe Ile Val Leu Asn Lys Gly Lys Thr
                85                  90                  95
Ile Phe Arg Phe Asn Ala Thr Pro Ala Leu Tyr Met Leu Ser Pro Phe
            100                 105                 110
Ser Pro Leu Arg Arg Ile Ser Ile Lys Ile Leu Val His Ser Leu Phe
        115                 120                 125
Ser Met Leu Ile Met Cys Thr Ile Leu Thr Asn Cys Ile Phe Met Thr
    130                 135                 140
Met Asn Asn Pro Gln Asp Trp Thr Lys Asn Val Glu Tyr Thr Phe Thr
145                 150                 155                 160
Gly Ile Tyr Thr Phe Glu Ser Leu Val Lys Ile Leu Ala Arg Gly Phe
                165                 170                 175
Cys Val Gly Glu Phe Thr Phe Leu Arg Asp Pro Trp Asn Trp Leu Asp
            180                 185                 190
Phe Val Val Ile Val Phe Ala Tyr Leu Thr Glu Phe Val Asn Leu Gly
        195                 200                 205
Asn Val Ser Ala Leu Arg Thr Phe Arg Val Leu Arg Ala Leu Lys Thr
    210                 215                 220
Ile Ser Val Ile Pro Gly Leu Lys Thr Ile Val Gly Ala Leu Ile Gln
225                 230                 235                 240
Ser Val Lys Lys Leu Ser Asp Val Met Ile Leu Thr Val Phe Cys Leu
                245                 250                 255
Ser Val Phe Ala Leu Ile Gly Leu Gln Leu Phe Met Gly Asn Leu Lys
            260                 265                 270
His Lys Cys Phe Arg Asn Ser Leu Glu Asn Asn Glu Thr Leu Glu Ser
        275                 280                 285
Ile Met Asn Thr Leu Glu Ser Glu Glu Asp Phe Arg Lys Tyr Phe Tyr
    290                 295                 300
Tyr Leu Glu Gly Ser Lys Asp Ala Leu Leu Cys Gly Phe Ser Thr Asp
305                 310                 315                 320
Ser Gly Gln Cys Pro Glu Gly Tyr Thr Cys Val Lys Ile Gly Arg Asn
                325                 330                 335
Pro Asp Tyr Gly Tyr Thr Ser Phe Asp Thr Phe Ser Trp Ala Phe Leu
            340                 345                 350
Ala Leu Phe Arg Leu Met Thr Gln Asp Tyr Trp Glu Asn Leu Tyr Gln
        355                 360                 365
Gln Thr Leu Arg Ala Ala Gly Lys Thr Tyr Met Ile Phe Phe Val Val
    370                 375                 380
Val Ile Phe Leu Gly Ser Phe Tyr Leu Ile Asn Leu Ile Leu Ala Val
385                 390                 395                 400
Val Ala Met Ala Tyr Glu Glu Gln Asn Gln Ala Asn Ile Glu Glu Ala
                405                 410                 415
Lys Gln Lys Glu Leu Glu Phe Gln Gln Met Leu Asp Arg Leu Lys Lys
            420                 425                 430
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Glu Gln Glu Glu Ala Glu Ala Ile Ala Ala Ala Ala Ala Glu Tyr Thr
        435                 440                 445
Ser Ile Arg Arg Ser Arg Ile Met Gly Leu Ser Glu Ser Ser Ser Glu
    450                 455                 460
Thr Ser Lys Leu Ser Ser Lys Ser Ala Lys Glu Arg Arg Asn Arg Arg
465                 470                 475                 480
Lys Lys Lys Asn Gln Lys Lys Leu Ser Ser Gly Glu Glu Lys Gly Asp
                485                 490                 495
Ala Glu Lys Leu Ser Lys Ser Glu Ser Glu Asp Ser Ile Arg Arg Lys
            500                 505                 510
Ser Phe His Leu Gly Val Glu Gly His Arg Arg Ala His Glu Lys Arg
        515                 520                 525
Leu Ser Thr Pro Asn Gln Ser Pro Leu Ser Ile Arg Gly Ser Leu Phe
    530                 535                 540
Ser Ala Arg Arg Ser Ser Arg Thr Ser Leu Phe Ser Phe Lys Gly Arg
545                 550                 555                 560
Gly Arg Asp Ile Gly Ser Glu Thr Glu Phe Ala Asp Asp Glu His Ser
                565                 570                 575
Ile Phe Gly Asp Asn Glu Ser Arg Arg Gly Ser Leu Phe Val Pro His
            580                 585                 590
Arg Pro Gln Glu Arg Arg Ser Ser Asn Ile Ser Gln Ala Ser Arg Ser
        595                 600                 605
Pro Pro Met Leu Pro Val Asn Gly Lys Met His Ser Ala Val Asp Cys
    610                 615                 620
Asn Gly Val Val Ser Leu Val Asp Gly Arg Ser Ala Leu Met Leu Pro
625                 630                 635                 640
Asn Gly Gln Leu Leu Pro Glu Gly Thr Thr Asn Gln Ile His Lys Lys
                645                 650                 655
Arg Arg Cys Ser Ser Tyr Leu Leu Ser Glu Asp Met Leu Asn Asp Pro
            660                 665                 670
Asn Leu Arg Gln Arg Ala Met Ser Arg Ala Ser Ile Leu Thr Asn Thr
        675                 680                 685
Val Glu Glu Leu Glu Glu Ser Arg Gln Lys Cys Pro Pro Trp Trp Tyr
    690                 695                 700
Arg Phe Ala His Lys Phe Leu Ile Trp Asn Cys Ser Pro Tyr Trp Ile
705                 710                 715                 720
Lys Phe Lys Lys Cys Ile Tyr Phe Ile Val Met Asp Pro Phe Val Asp
                725                 730                 735
Leu Ala Ile Thr Ile Cys Ile Val Leu Asn Thr Leu Phe Met Ala Met
            740                 745                 750
Glu His His Pro Met Thr Glu Glu Phe Lys Asn Val Leu Ala Ile Gly
        755                 760                 765
Asn Leu Val Phe Thr Gly Ile Phe Ala Ala Glu Met Val Leu Lys Leu
    770                 775                 780
Ile Ala Met Asp Pro Tyr Glu Tyr Phe Gln Val Gly Trp Asn Ile Phe
785                 790                 795                 800
Asp Ser Leu Ile Val Thr Leu Ser Leu Val Glu Leu Phe Leu Ala Asp
                805                 810                 815
Val Glu Gly Leu Ser Val Leu Arg Ser Phe Arg Leu Leu Arg Val Phe
            820                 825                 830
Lys Leu Ala Lys Ser Trp Pro Thr Leu Asn Met Leu Ile Lys Ile Ile
        835                 840                 845
Gly Asn Ser Val Gly Ala Leu Gly Asn Leu Thr Leu Val Leu Ala Ile
    850                 855                 860
Ile Val Phe Ile Phe Ala Val Val Gly Met Gln Leu Phe Gly Lys Ser
865                 870                 875                 880
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Tyr Lys Glu Cys Val Cys Lys Ile Asn Asp Asp Cys Thr Leu Pro Arg
                885                 890                 895
Trp His Met Asn Asp Phe Phe His Ser Phe Leu Ile Val Phe Arg Val
            900                 905                 910
Leu Cys Gly Glu Trp Ile Glu Thr Met Trp Asp Cys Met Glu Val Ala
        915                 920                 925
Gly Gln Ala Met Cys Leu Ile Val Tyr Met Met Val Met Val Ile Gly
    930                 935                 940
Asn Leu Val Val Leu Asn Leu Phe Leu Ala Leu Leu Leu Ser Ser Phe
945                 950                 955                 960
Ser Ser Asp Asn Leu Thr Ala Ile Glu Glu Asp Pro Asp Ala Asn Asn
                965                 970                 975
Leu Gln Ile Ala Val Thr Arg Ile Lys Lys Gly Ile Asn Tyr Val Lys
            980                 985                 990
Gln Thr Leu Arg Glu Phe Ile Leu Lys Ala Phe Ser Lys Lys Pro Lys
        995                 1000                1005
Ile Ser Arg Glu Ile Arg Gln Ala Glu Asp Leu Asn Thr Lys Lys Glu
    1010                1015                1020
Asn Tyr Ile Ser Asn His Thr Leu Ala Glu Met Ser Lys Gly His Asn
1025                1030                1035                1040
Phe Leu Lys Glu Lys Asp Lys Ile Ser Gly Phe Gly Ser Ser Val Asp
                1045                1050                1055
Lys His Leu Met Glu Asp Ser Asp Gly Gln Ser Phe Ile His Asn Pro
            1060                1065                1070
Ser Leu Thr Val Thr Val Pro Ile Ala Pro Gly Glu Ser Asp Leu Glu
        1075                1080                1085
Asn Met Asn Ala Glu Glu Leu Ser Ser Asp Ser Asp Ser Glu Tyr Ser
    1090                1095                1100
Lys Val Arg Leu Asn Arg Ser Ser Ser Ser Glu Cys Ser Thr Val Asp
1105                1110                1115                1120
Asn Pro Leu Pro Gly Glu Gly Glu Glu Ala Glu Ala Glu Pro Met Asn
                1125                1130                1135
Ser Asp Glu Pro Glu Ala Cys Phe Thr Asp Gly Cys Val Arg Arg Phe
            1140                1145                1150
Ser Cys Cys Gln Val Asn Ile Glu Ser Gly Lys Gly Lys Ile Trp Trp
        1155                1160                1165
Asn Ile Arg Lys Thr Cys Tyr Lys Ile Val Glu His Ser Trp Phe Glu
    1170                1175                1180
Ser Phe Ile Val Leu Met Ile Leu Leu Ser Ser Gly Ala Leu Ala Phe
1185                1190                1195                1200
Glu Asp Ile Tyr Ile Glu Arg Lys Lys Thr Ile Lys Ile Ile Leu Glu
                1205                1210                1215
Tyr Ala Asp Lys Ile Phe Thr Tyr Ile Phe Ile Leu Glu Met Leu Leu
            1220                1225                1230
Lys Trp Ile Ala Tyr Gly Tyr Lys Thr Tyr Phe Thr Asn Ala Trp Cys
        1235                1240                1245
Trp Leu Asp Phe Leu Ile Val Asp Val Ser Leu Val Thr Leu Val Ala
    1250                1255                1260
Asn Thr Leu Gly Tyr Ser Asp Leu Gly Pro Ile Lys Ser Leu Arg Thr
1265                1270                1275                1280
Leu Arg Ala Leu Arg Pro Leu Arg Ala Leu Ser Arg Phe Glu Gly Met
                1285                1290                1295
Arg Val Val Val Asn Ala Leu Ile Gly Ala Ile Pro Ser Ile Met Asn
            1300                1305                1310
Val Leu Leu Val Cys Leu Ile Phe Trp Leu Ile Phe Ser Ile Met Gly
        1315                1320                1325
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Val Asn Leu Phe Ala Gly Lys Phe Tyr Glu Cys Ile Asn Thr Thr Asp
    1330                1335                1340
Gly Ser Arg Phe Pro Ala Ser Gln Val Pro Asn Arg Ser Glu Cys Phe
1345                1350                1355                1360
Ala Leu Met Asn Val Ser Gln Asn Val Arg Trp Lys Asn Leu Lys Val
                1365                1370                1375
Asn Phe Asp Asn Val Gly Leu Gly Tyr Leu Ser Leu Leu Gln Val Ala
            1380                1385                1390
Thr Phe Lys Gly Trp Thr Ile Ile Met Tyr Ala Ala Val Asp Ser Val
        1395                1400                1405
Asn Val Asp Lys Gln Pro Lys Tyr Glu Tyr Ser Leu Tyr Met Tyr Ile
    1410                1415                1420
Tyr Phe Val Val Phe Ile Ile Phe Gly Ser Phe Phe Thr Leu Asn Leu
1425                1430                1435                1440
Phe Ile Gly Val Ile Ile Asp Asn Phe Asn Gln Gln Lys Lys Lys Leu
                1445                1450                1455
Gly Gly Gln Asp Ile Phe Met Thr Glu Glu Gln Lys Lys Tyr Tyr Asn
            1460                1465                1470
Ala Met Lys Lys Leu Gly Ser Lys Lys Pro Gln Lys Pro Ile Pro Arg
        1475                1480                1485
Pro Gly Asn Lys Ile Gln Gly Cys Ile Phe Asp Leu Val Thr Asn Gln
    1490                1495                1500
Ala Phe Asp Ile Ser Ile Met Val Leu Ile Cys Leu Asn Met Val Thr
1505                1510                1515                1520
Met Met Val Glu Lys Glu Gly Gln Ser Gln His Met Thr Glu Val Leu
                1525                1530                1535
Tyr Trp Ile Asn Val Val Phe Ile Ile Leu Phe Thr Gly Glu Cys Val
            1540                1545                1550
Leu Lys Leu Ile Ser Leu Arg His Tyr Tyr Phe Thr Val Gly Trp Asn
        1555                1560                1565
Ile Phe Asp Phe Val Val Val Ile Ile Ser Ile Val Gly Met Phe Leu
    1570                1575                1580
Ala Asp Leu Ile Glu Thr Tyr Phe Val Ser Pro Thr Leu Phe Arg Val
1585                1590                1595                1600
Ile Arg Leu Ala Arg Ile Gly Arg Ile Leu Arg Leu Val Lys Gly Ala
                1605                1610                1615
Lys Gly Ile Arg Thr Leu Leu Phe Ala Leu Met Met Ser Leu Pro Ala
            1620                1625                1630
Leu Phe Asn Ile Gly Leu Leu Leu Phe Leu Val Met Phe Ile Tyr Ala
        1635                1640                1645
Ile Phe Gly Met Ser Asn Phe Ala Tyr Val Lys Lys Glu Asp Gly Ile
    1650                1655                1660
Asn Asp Met Phe Asn Phe Glu Thr Phe Gly Asn Ser Met Ile Cys Leu
1665                1670                1675                1680
Phe Gln Ile Thr Thr Ser Ala Gly Trp Asp Gly Leu Leu Ala Pro Ile
                1685                1690                1695
Leu Asn Ser Lys Pro Pro Asp Cys Asp Pro Lys Lys Val His Pro Gly
            1700                1705                1710
Ser Ser Val Glu Gly Asp Cys Gly Asn Pro Ser Val Gly Ile Phe Tyr
        1715                1720                1725
Phe Val Ser Tyr Ile Ile Ile Ser Phe Leu Val Val Val Asn Met Tyr
    1730                1735                1740
Ile Ala Val Ile Leu Glu Asn Phe Ser Val Ala Thr Glu Glu Ser Thr
1745                1750                1755                1760
Glu Pro Leu Ser Glu Asp Asp Phe Glu Met Phe Tyr Glu Val Trp Glu
                1765                1770                1775
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Lys Phe Asp Pro Asp Ala Thr Gln Phe Ile Glu Phe Ser Lys Leu Ser
            1780                1785                1790
Asp Phe Ala Ala Ala Leu Asp Pro Pro Leu Leu Ile Ala Lys Pro Asn
        1795                1800                1805
Lys Val Gln Leu Ile Ala Met Asp Leu Pro Met Val Ser Gly Asp Arg
    1810                1815                1820
Ile His Cys Leu Asp Ile Leu Phe Ala Phe Thr Lys Arg Val Leu Gly
1825                1830                1835                1840
Glu Ser Gly Glu Met Asp Ser Leu Arg Ser Gln Met Glu Glu Arg Phe
                1845                1850                1855
Met Ser Ala Asn Pro Ser Lys Val Ser Tyr Glu Pro Ile Thr Thr Thr
            1860                1865                1870
Leu Lys Arg Lys Gln Glu Asp Val Ser Ala Thr Val Ile Gln Arg Ala
        1875                1880                1885
Tyr Arg Arg Tyr Arg Leu Arg Gln Asn Val Lys Asn Ile Ser Ser Ile
    1890                1895                1900
Tyr Ile Lys Asp Gly Asp Arg Asp Asp Asp Leu Leu Asn Lys Lys Asp
1905                1910                1915                1920
Met Ala Phe Asp Asn Val Asn Glu Asn Ser Ser Pro Glu Lys Thr Asp
                1925                1930                1935
Ala Thr Ser Ser Thr Thr Ser Pro Pro Ser Tyr Asp Ser Val Thr Lys
            1940                1945                1950
Pro Asp Lys Glu Lys Tyr Glu Gln Asp Arg Thr Glu Lys Glu Asp Lys
        1955                1960                1965
Gly Lys Asp Ser Lys Glu Ser Lys Lys
    1970                1975
```

<210> 4
<211> 1977
<212> PRT
<213> Homo Sapien

<400> 4

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Met Ala Met Leu Pro Pro Pro Gly Pro Gln Ser Phe Val His Phe Thr
 1               5                  10                  15
Lys Gln Ser Leu Ala Leu Ile Glu Gln Arg Ile Ala Glu Arg Lys Ser
            20                  25                  30
Lys Glu Pro Lys Glu Glu Lys Lys Asp Asp Asp Glu Glu Ala Pro Lys
        35                  40                  45
Pro Ser Ser Asp Leu Glu Ala Gly Lys Gln Leu Pro Phe Ile Tyr Gly
    50                  55                  60
Asp Ile Pro Pro Gly Met Val Ser Glu Pro Leu Glu Asp Leu Asp Pro
65                  70                  75                  80
Tyr Tyr Ala Asp Lys Lys Thr Phe Ile Val Leu Asn Lys Gly Lys Thr
                85                  90                  95
Ile Phe Arg Phe Asn Ala Thr Pro Ala Leu Tyr Met Leu Ser Pro Phe
            100                 105                 110
Ser Pro Leu Arg Arg Ile Ser Ile Lys Ile Leu Val His Ser Leu Phe
        115                 120                 125
Ser Met Leu Ile Met Cys Thr Ile Leu Thr Asn Cys Ile Phe Met Thr
    130                 135                 140
Met Asn Asn Pro Pro Asp Trp Thr Lys Asn Val Glu Tyr Thr Phe Thr
145                 150                 155                 160
Gly Ile Tyr Thr Phe Glu Ser Leu Val Lys Ile Leu Ala Arg Gly Phe
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                165                 170                 175
Cys Val Gly Glu Phe Thr Phe Leu Arg Asp Pro Trp Asn Trp Leu Asp
            180                 185                 190
Phe Val Val Ile Val Phe Ala Tyr Leu Thr Glu Phe Val Asn Leu Gly
        195                 200                 205
Asn Val Ser Ala Leu Arg Thr Phe Arg Val Leu Arg Ala Leu Lys Thr
    210                 215                 220
Ile Ser Val Ile Pro Gly Leu Lys Thr Ile Val Gly Ala Leu Ile Gln
225                 230                 235                 240
Ser Val Lys Lys Leu Ser Asp Val Met Ile Leu Thr Val Phe Cys Leu
                245                 250                 255
Ser Val Phe Ala Leu Ile Gly Leu Gln Leu Phe Met Gly Asn Leu Lys
            260                 265                 270
His Lys Cys Phe Arg Asn Ser Leu Glu Asn Asn Glu Thr Leu Glu Ser
        275                 280                 285
Ile Met Asn Thr Leu Glu Ser Glu Glu Asp Phe Arg Lys Tyr Phe Tyr
    290                 295                 300
Tyr Leu Glu Gly Ser Lys Asp Ala Leu Leu Cys Gly Phe Ser Thr Asp
305                 310                 315                 320
Ser Gly Gln Cys Pro Glu Gly Tyr Thr Cys Val Lys Ile Gly Arg Asn
                325                 330                 335
Pro Asp Tyr Gly Tyr Thr Ser Phe Asp Thr Phe Ser Trp Ala Phe Leu
            340                 345                 350
Ala Leu Phe Arg Leu Met Thr Gln Asp Tyr Trp Glu Asn Leu Tyr Gln
        355                 360                 365
Gln Thr Leu Arg Ala Ala Gly Lys Thr Tyr Met Ile Phe Phe Val Val
    370                 375                 380
Val Ile Phe Leu Gly Ser Phe Tyr Leu Ile Asn Leu Ile Leu Ala Val
385                 390                 395                 400
Val Ala Met Ala Tyr Glu Glu Gln Asn Gln Ala Asn Ile Glu Glu Ala
                405                 410                 415
Lys Gln Lys Glu Leu Glu Phe Gln Gln Met Leu Asp Arg Leu Lys Lys
            420                 425                 430
Glu Gln Glu Glu Ala Glu Ala Ile Ala Ala Ala Ala Ala Glu Tyr Thr
        435                 440                 445
Ser Ile Arg Arg Ser Arg Ile Met Gly Leu Ser Glu Ser Ser Ser Glu
    450                 455                 460
Thr Ser Lys Leu Ser Ser Lys Ser Ala Lys Glu Arg Arg Asn Arg Arg
465                 470                 475                 480
Lys Lys Lys Asn Gln Lys Lys Leu Ser Ser Gly Glu Glu Lys Gly Asp
                485                 490                 495
Ala Glu Lys Leu Ser Lys Ser Glu Ser Glu Asp Ser Ile Arg Arg Lys
            500                 505                 510
Ser Phe His Leu Gly Val Glu Gly His Arg Arg Ala His Glu Lys Arg
        515                 520                 525
Leu Ser Thr Pro Asn Gln Ser Pro Leu Ser Ile Arg Gly Ser Leu Phe
    530                 535                 540
Ser Ala Arg Arg Ser Ser Arg Thr Ser Leu Phe Ser Phe Lys Gly Arg
545                 550                 555                 560
Gly Arg Asp Ile Gly Ser Glu Thr Glu Phe Ala Asp Asp Glu His Ser
                565                 570                 575
Ile Phe Gly Asp Asn Glu Ser Arg Arg Gly Ser Leu Phe Val Pro His
            580                 585                 590
Arg Pro Gln Glu Arg Arg Ser Ser Asn Ile Ser Gln Ala Ser Arg Ser
        595                 600                 605
Pro Pro Met Leu Pro Val Asn Gly Lys Met His Ser Ala Val Asp Cys
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    610                 615                 620
Asn Gly Val Val Ser Leu Val Asp Gly Arg Ser Ala Leu Met Leu Pro
625                 630                 635                 640
Tyr Gly Gln Leu Leu Pro Glu Gly Thr Thr Asn Gln Ile His Lys Lys
                645                 650                 655
Arg Arg Cys Ser Ser Tyr Leu Leu Ser Glu Asp Met Leu Asn Asp Pro
            660                 665                 670
Asn Leu Arg Gln Arg Ala Met Ser Arg Ala Ser Ile Leu Thr Asn Thr
        675                 680                 685
Val Glu Glu Leu Glu Glu Ser Arg Gln Lys Cys Pro Pro Trp Trp Tyr
    690                 695                 700
Arg Phe Ala His Lys Phe Leu Ile Trp Asn Cys Ser Pro Tyr Trp Ile
705                 710                 715                 720
Lys Phe Lys Lys Cys Ile Tyr Phe Ile Val Met Asp Pro Phe Val Asp
                725                 730                 735
Leu Ala Ile Thr Ile Cys Ile Val Leu Asn Thr Leu Phe Met Ala Met
            740                 745                 750
Glu His His Pro Met Thr Glu Glu Phe Lys Asn Val Leu Ala Ile Gly
        755                 760                 765
Asn Leu Val Phe Thr Gly Ile Phe Ala Ala Glu Met Val Leu Lys Leu
    770                 775                 780
Ile Ala Met Asp Pro Tyr Glu Tyr Phe Gln Val Gly Trp Asn Ile Phe
785                 790                 795                 800
Asp Ser Leu Ile Val Thr Leu Ser Leu Val Glu Leu Phe Leu Ala Asp
                805                 810                 815
Val Glu Gly Leu Ser Val Leu Arg Ser Phe Arg Leu Leu Arg Val Phe
            820                 825                 830
Lys Leu Ala Lys Ser Trp Pro Thr Leu Asn Met Leu Ile Lys Ile Ile
        835                 840                 845
Gly Asn Ser Val Gly Ala Leu Gly Asn Leu Thr Leu Val Leu Ala Ile
    850                 855                 860
Ile Val Phe Ile Phe Ala Val Val Gly Met Gln Leu Phe Gly Lys Ser
865                 870                 875                 880
Tyr Lys Glu Cys Val Cys Lys Ile Asn Asp Asp Cys Thr Leu Pro Arg
                885                 890                 895
Trp His Met Asn Asp Phe Phe His Ser Phe Leu Ile Val Phe Arg Val
            900                 905                 910
Leu Cys Gly Glu Trp Ile Glu Thr Met Trp Asp Cys Met Glu Val Ala
        915                 920                 925
Gly Gln Ala Met Cys Leu Ile Val Tyr Met Met Val Met Val Ile Gly
    930                 935                 940
Asn Leu Val Val Leu Asn Leu Phe Leu Ala Leu Leu Leu Ser Ser Phe
945                 950                 955                 960
Ser Ser Asp Asn Leu Thr Ala Ile Glu Glu Asp Pro Asp Ala Asn Asn
                965                 970                 975
Leu Gln Ile Ala Val Thr Arg Ile Lys Lys Gly Ile Asn Tyr Val Lys
            980                 985                 990
Gln Thr Leu Arg Glu Phe Ile Leu Lys Ala Phe Ser Lys Lys Pro Lys
        995                 1000                1005
Ile Ser Arg Glu Ile Arg Gln Ala Glu Asp Leu Asn Thr Lys Lys Glu
    1010                1015                1020
Asn Tyr Ile Ser Asn His Thr Leu Ala Glu Met Ser Lys Gly His Asn
1025                1030                1035                1040
Phe Leu Lys Glu Lys Asp Lys Ile Ser Gly Phe Gly Ser Ser Val Asp
                1045                1050                1055
Lys His Leu Met Glu Asp Ser Asp Gly Gln Ser Phe Ile His Asn Pro
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            1060                1065                1070
Ser Leu Thr Val Thr Val Pro Ile Ala Pro Gly Glu Ser Asp Leu Glu
        1075                1080                1085
Asn Met Asn Ala Glu Glu Leu Ser Ser Asp Ser Asp Ser Glu Tyr Ser
    1090                1095                1100
Lys Val Arg Leu Asn Arg Ser Ser Ser Ser Glu Cys Ser Thr Val Asp
1105                1110                1115                1120
Asn Pro Leu Pro Gly Glu Gly Glu Glu Ala Glu Ala Glu Pro Met Asn
                1125                1130                1135
Ser Asp Glu Pro Glu Ala Cys Phe Thr Asp Gly Cys Val Arg Arg Phe
            1140                1145                1150
Ser Cys Cys Gln Val Asn Ile Glu Ser Gly Lys Gly Lys Ile Trp Trp
        1155                1160                1165
Asn Ile Arg Lys Thr Cys Tyr Lys Ile Val Glu His Ser Trp Phe Glu
    1170                1175                1180
Ser Phe Ile Val Leu Met Ile Leu Leu Ser Ser Gly Ala Leu Ala Phe
1185                1190                1195                1200
Glu Asp Ile Tyr Ile Glu Arg Lys Lys Thr Ile Lys Ile Ile Leu Glu
                1205                1210                1215
Tyr Ala Asp Lys Ile Phe Thr Tyr Ile Phe Ile Leu Glu Met Leu Leu
            1220                1225                1230
Lys Trp Ile Ala Tyr Gly Tyr Lys Thr Tyr Phe Thr Asn Ala Trp Cys
        1235                1240                1245
Trp Leu Asp Phe Leu Ile Val Asp Val Ser Leu Val Thr Leu Val Ala
    1250                1255                1260
Asn Thr Leu Gly Tyr Ser Asp Leu Gly Pro Ile Lys Ser Leu Arg Thr
1265                1270                1275                1280
Leu Arg Ala Leu Arg Pro Leu Arg Ala Leu Ser Arg Phe Glu Gly Met
                1285                1290                1295
Arg Val Val Val Asn Ala Leu Ile Gly Ala Ile Pro Ser Ile Met Asn
            1300                1305                1310
Val Leu Leu Val Cys Leu Ile Phe Trp Leu Ile Phe Ser Ile Met Gly
        1315                1320                1325
Val Asn Leu Phe Ala Gly Lys Phe Tyr Glu Cys Ile Asn Thr Thr Asp
    1330                1335                1340
Gly Ser Arg Phe Pro Ala Ser Gln Val Pro Asn Arg Ser Glu Cys Phe
1345                1350                1355                1360
Ala Leu Met Asn Val Ser Gln Asn Val Arg Trp Lys Asn Leu Lys Val
                1365                1370                1375
Asn Phe Asp Asn Val Gly Leu Gly Tyr Leu Ser Leu Leu Gln Val Ala
            1380                1385                1390
Thr Phe Lys Gly Trp Thr Ile Ile Met Tyr Ala Ala Val Asp Ser Val
        1395                1400                1405
Asn Val Asp Lys Gln Pro Lys Tyr Glu Tyr Ser Leu Tyr Met Tyr Ile
    1410                1415                1420
Tyr Phe Val Val Phe Ile Ile Phe Gly Ser Phe Phe Thr Leu Asn Leu
1425                1430                1435                1440
Phe Ile Gly Val Ile Ile Asp Asn Phe Asn Gln Gln Lys Lys Lys Leu
                1445                1450                1455
Gly Gly Gln Asp Ile Phe Met Thr Glu Glu Gln Lys Lys Tyr Tyr Asn
            1460                1465                1470
Ala Met Lys Lys Leu Gly Ser Lys Lys Pro Gln Lys Pro Ile Pro Arg
        1475                1480                1485
Pro Gly Asn Lys Ile Gln Gly Cys Ile Phe Asp Leu Val Thr Asn Gln
    1490                1495                1500
Ala Phe Asp Ile Ser Ile Met Val Leu Ile Cys Leu Asn Met Val Thr
```

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1505                1510                1515                1520
Met Met Val Glu Lys Glu Gly Gln Ser Gln His Met Thr Glu Val Leu
                1525                1530                1535
Tyr Trp Ile Asn Val Val Phe Ile Ile Leu Phe Thr Gly Glu Cys Val
            1540                1545                1550
Leu Lys Leu Ile Ser Leu Arg His Tyr Tyr Phe Thr Val Gly Trp Asn
        1555                1560                1565
Ile Phe Asp Phe Val Val Val Ile Ile Ser Ile Val Gly Met Phe Leu
    1570                1575                1580
Ala Asp Leu Ile Glu Thr Tyr Phe Val Ser Pro Thr Leu Phe Arg Val
1585                1590                1595                1600
Ile Arg Leu Ala Arg Ile Gly Arg Ile Leu Arg Leu Val Lys Gly Ala
                1605                1610                1615
Lys Gly Ile Arg Thr Leu Leu Phe Ala Leu Met Met Ser Leu Pro Ala
            1620                1625                1630
Leu Phe Asn Ile Gly Leu Leu Leu Phe Leu Val Met Phe Ile Tyr Ala
        1635                1640                1645
Ile Phe Gly Met Ser Asn Phe Ala Tyr Val Lys Lys Glu Asp Gly Ile
    1650                1655                1660
Asn Asp Met Phe Asn Phe Glu Thr Phe Gly Asn Ser Met Ile Cys Leu
1665                1670                1675                1680
Phe Gln Ile Thr Thr Ser Ala Gly Trp Asp Gly Leu Leu Ala Pro Ile
                1685                1690                1695
Leu Asn Ser Lys Pro Pro Asp Cys Asp Pro Lys Lys Val His Pro Gly
            1700                1705                1710
Ser Ser Val Glu Gly Asp Cys Gly Asn Pro Ser Val Gly Ile Phe Tyr
        1715                1720                1725
Phe Val Ser Tyr Ile Ile Ile Ser Phe Leu Val Val Val Asn Met Tyr
    1730                1735                1740
Ile Ala Val Ile Leu Glu Asn Phe Ser Val Ala Thr Glu Glu Ser Thr
1745                1750                1755                1760
Glu Pro Leu Ser Glu Asp Asp Phe Glu Met Phe Tyr Glu Val Trp Glu
                1765                1770                1775
Lys Phe Asp Pro Asp Ala Thr Gln Phe Ile Glu Phe Ser Lys Leu Ser
            1780                1785                1790
Asp Phe Ala Ala Ala Leu Asp Pro Pro Leu Leu Ile Ala Lys Pro Asn
        1795                1800                1805
Lys Val Gln Leu Ile Ala Met Asp Leu Pro Met Val Ser Gly Asp Arg
    1810                1815                1820
Ile His Cys Leu Asp Ile Leu Phe Ala Phe Thr Lys Arg Val Leu Gly
1825                1830                1835                1840
Glu Ser Gly Glu Met Asp Ser Leu Arg Ser Gln Met Glu Glu Arg Phe
                1845                1850                1855
Met Ser Ala Asn Pro Ser Lys Val Ser Tyr Glu Pro Ile Thr Thr Thr
            1860                1865                1870
Leu Lys Arg Lys Gln Glu Asp Val Ser Ala Thr Val Ile Gln Arg Ala
        1875                1880                1885
Tyr Arg Arg Tyr Arg Leu Arg Gln Asn Val Lys Asn Ile Ser Ser Ile
    1890                1895                1900
Tyr Ile Lys Asp Gly Asp Arg Asp Asp Asp Leu Leu Asn Lys Lys Asp
1905                1910                1915                1920
Met Ala Phe Asp Asn Val Asn Glu Asn Ser Ser Pro Glu Lys Thr Asp
                1925                1930                1935
Ala Thr Ser Ser Thr Thr Ser Pro Pro Ser Tyr Asp Ser Val Thr Lys
            1940                1945                1950
Pro Asp Lys Glu Lys Tyr Glu Gln Asp Arg Thr Glu Lys Glu Asp Lys
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        1955                1960                1965
Gly Lys Asp Ser Lys Glu Ser Lys Lys
    1970                1975
```

<210> 5
<211> 1977
<212> PRT
<213> Homo Sapien

<400> 5

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Met Ala Met Leu Pro Pro Pro Gly Pro Gln Ser Phe Val His Phe Thr
 1               5                  10                  15
Lys Gln Ser Leu Ala Leu Ile Glu Gln Arg Ile Ala Glu Arg Lys Ser
            20                  25                  30
Lys Glu Pro Lys Glu Glu Lys Lys Asp Asp Asp Glu Glu Ala Pro Lys
        35                  40                  45
Pro Ser Ser Asp Leu Glu Ala Gly Lys Gln Leu Pro Phe Ile Tyr Gly
    50                  55                  60
Asp Ile Pro Pro Gly Met Val Ser Glu Pro Leu Glu Asp Leu Asp Pro
65                  70                  75                  80
Tyr Tyr Ala Asp Lys Lys Thr Phe Ile Val Leu Asn Lys Gly Lys Thr
                85                  90                  95
Ile Phe Arg Phe Asn Ala Thr Pro Ala Leu Tyr Met Leu Ser Pro Phe
            100                 105                 110
Ser Pro Leu Arg Arg Ile Ser Ile Lys Ile Leu Val His Ser Leu Phe
        115                 120                 125
Ser Met Leu Ile Met Cys Thr Ile Leu Thr Asn Cys Ile Phe Met Thr
    130                 135                 140
Met Asn Asn Pro Pro Asp Trp Thr Lys Asn Val Glu Tyr Thr Phe Thr
145                 150                 155                 160
Gly Ile Tyr Thr Phe Glu Ser Leu Val Lys Ile Leu Ala Arg Gly Phe
                165                 170                 175
Cys Val Gly Glu Phe Thr Phe Leu Arg Asp Pro Trp Asn Trp Leu Asp
            180                 185                 190
Phe Val Val Ile Val Phe Ala Tyr Leu Thr Glu Phe Val Asn Leu Gly
        195                 200                 205
Asn Val Ser Ala Leu Arg Thr Phe Arg Val Leu Arg Ala Leu Lys Thr
    210                 215                 220
Ile Ser Val Ile Pro Gly Leu Lys Thr Ile Val Gly Ala Leu Ile Gln
225                 230                 235                 240
Ser Val Lys Lys Leu Ser Asp Val Met Ile Leu Thr Val Phe Cys Leu
                245                 250                 255
Ser Val Phe Ala Leu Ile Gly Leu Gln Leu Phe Met Gly Asn Leu Lys
            260                 265                 270
His Lys Cys Phe Arg Asn Ser Leu Glu Asn Asn Glu Thr Leu Glu Ser
        275                 280                 285
Ile Met Asn Thr Leu Glu Ser Glu Glu Asp Phe Arg Lys Tyr Phe Tyr
    290                 295                 300
Tyr Leu Glu Gly Ser Lys Asp Ala Leu Leu Cys Gly Phe Ser Thr Asp
305                 310                 315                 320
Ser Gly Gln Cys Pro Glu Gly Tyr Thr Cys Val Lys Ile Gly Arg Asn
                325                 330                 335
Pro Asp Tyr Gly Tyr Thr Ser Phe Asp Thr Phe Ser Trp Ala Phe Leu
            340                 345                 350
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Ala Leu Phe Arg Leu Met Thr Gln Asp Tyr Trp Glu Asn Leu Tyr Gln
        355                 360                 365
Gln Thr Leu Arg Ala Ala Gly Lys Thr Tyr Met Ile Phe Phe Val Val
    370                 375                 380
Val Ile Phe Leu Gly Ser Phe Tyr Leu Ile Asn Leu Ile Leu Ala Val
385                 390                 395                 400
Val Ala Met Ala Tyr Glu Glu Gln Asn Gln Ala Asn Ile Glu Glu Ala
                405                 410                 415
Lys Gln Lys Glu Leu Glu Phe Gln Gln Met Leu Asp Arg Leu Lys Lys
            420                 425                 430
Glu Gln Glu Glu Ala Glu Ala Ile Ala Ala Ala Ala Ala Glu Tyr Thr
        435                 440                 445
Ser Ile Arg Arg Ser Arg Ile Met Gly Leu Ser Glu Ser Ser Ser Glu
    450                 455                 460
Thr Ser Lys Leu Ser Ser Lys Ser Ala Lys Glu Arg Arg Asn Arg Arg
465                 470                 475                 480
Lys Lys Lys Asn Gln Lys Lys Leu Ser Ser Gly Glu Glu Lys Gly Asp
                485                 490                 495
Ala Glu Lys Leu Ser Lys Ser Glu Ser Glu Asp Ser Ile Arg Arg Lys
            500                 505                 510
Ser Phe His Leu Gly Val Glu Gly His Arg Arg Ala His Glu Lys Arg
        515                 520                 525
Leu Ser Thr Pro Asn Gln Ser Pro Leu Ser Ile Arg Gly Ser Leu Phe
    530                 535                 540
Ser Ala Arg Arg Ser Ser Arg Thr Ser Leu Phe Ser Phe Lys Gly Arg
545                 550                 555                 560
Gly Arg Asp Ile Gly Ser Glu Thr Glu Phe Ala Asp Asp Glu His Ser
                565                 570                 575
Ile Phe Gly Asp Asn Glu Ser Arg Arg Gly Ser Leu Phe Val Pro His
            580                 585                 590
Arg Pro Gln Glu Arg Arg Ser Ser Asn Ile Ser Gln Ala Ser Arg Ser
        595                 600                 605
Pro Pro Met Leu Pro Val Asn Gly Lys Met His Ser Ala Val Asp Cys
    610                 615                 620
Asn Gly Val Val Ser Leu Val Asp Gly Arg Ser Ala Leu Met Leu Pro
625                 630                 635                 640
Asn Gly Gln Leu Leu Pro Glu Gly Thr Thr Asn Gln Ile His Arg Lys
                645                 650                 655
Arg Arg Cys Ser Ser Tyr Leu Leu Ser Glu Asp Met Leu Asn Asp Pro
            660                 665                 670
Asn Leu Arg Gln Arg Ala Met Ser Arg Ala Ser Ile Leu Thr Asn Thr
        675                 680                 685
Val Glu Glu Leu Glu Glu Ser Arg Gln Lys Cys Pro Pro Trp Trp Tyr
    690                 695                 700
Arg Phe Ala His Lys Phe Leu Ile Trp Asn Cys Ser Pro Tyr Trp Ile
705                 710                 715                 720
Lys Phe Lys Lys Cys Ile Tyr Phe Ile Val Met Asp Pro Phe Val Asp
                725                 730                 735
Leu Ala Ile Thr Ile Cys Ile Val Leu Asn Thr Leu Phe Met Ala Met
            740                 745                 750
Glu His His Pro Met Thr Glu Glu Phe Lys Asn Val Leu Ala Ile Gly
        755                 760                 765
Asn Leu Val Phe Thr Gly Ile Phe Ala Ala Glu Met Val Leu Lys Leu
    770                 775                 780
Ile Ala Met Asp Pro Tyr Glu Tyr Phe Gln Val Gly Trp Asn Ile Phe
785                 790                 795                 800
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Asp Ser Leu Ile Val Thr Leu Ser Leu Val Glu Leu Phe Leu Ala Asp
                805                 810                 815
Val Glu Gly Leu Ser Val Leu Arg Ser Phe Arg Leu Leu Arg Val Phe
            820                 825                 830
Lys Leu Ala Lys Ser Trp Pro Thr Leu Asn Met Leu Ile Lys Ile Ile
        835                 840                 845
Gly Asn Ser Val Gly Ala Leu Gly Asn Leu Thr Leu Val Leu Ala Ile
    850                 855                 860
Ile Val Phe Ile Phe Ala Val Val Gly Met Gln Leu Phe Gly Lys Ser
865                 870                 875                 880
Tyr Lys Glu Cys Val Cys Lys Ile Asn Asp Asp Cys Thr Leu Pro Arg
                885                 890                 895
Trp His Met Asn Asp Phe Phe His Ser Phe Leu Ile Val Phe Arg Val
            900                 905                 910
Leu Cys Gly Glu Trp Ile Glu Thr Met Trp Asp Cys Met Glu Val Ala
        915                 920                 925
Gly Gln Ala Met Cys Leu Ile Val Tyr Met Met Val Met Val Ile Gly
    930                 935                 940
Asn Leu Val Val Leu Asn Leu Phe Leu Ala Leu Leu Leu Ser Ser Phe
945                 950                 955                 960
Ser Ser Asp Asn Leu Thr Ala Ile Glu Glu Asp Pro Asp Ala Asn Asn
                965                 970                 975
Leu Gln Ile Ala Val Thr Arg Ile Lys Lys Gly Ile Asn Tyr Val Lys
            980                 985                 990
Gln Thr Leu Arg Glu Phe Ile Leu Lys Ala Phe Ser Lys Lys Pro Lys
        995                 1000                1005
Ile Ser Arg Glu Ile Arg Gln Ala Glu Asp Leu Asn Thr Lys Lys Glu
    1010                1015                1020
Asn Tyr Ile Ser Asn His Thr Leu Ala Glu Met Ser Lys Gly His Asn
1025                1030                1035                1040
Phe Leu Lys Glu Lys Asp Lys Ile Ser Gly Phe Gly Ser Ser Val Asp
                1045                1050                1055
Lys His Leu Met Glu Asp Ser Asp Gly Gln Ser Phe Ile His Asn Pro
            1060                1065                1070
Ser Leu Thr Val Thr Val Pro Ile Ala Pro Gly Glu Ser Asp Leu Glu
        1075                1080                1085
Asn Met Asn Ala Glu Glu Leu Ser Ser Asp Ser Asp Ser Glu Tyr Ser
    1090                1095                1100
Lys Val Arg Leu Asn Arg Ser Ser Ser Ser Glu Cys Ser Thr Val Asp
1105                1110                1115                1120
Asn Pro Leu Pro Gly Glu Gly Glu Glu Ala Glu Ala Glu Pro Met Asn
                1125                1130                1135
Ser Asp Glu Pro Glu Ala Cys Phe Thr Asp Gly Cys Val Arg Arg Phe
            1140                1145                1150
Ser Cys Cys Gln Val Asn Ile Glu Ser Gly Lys Gly Lys Ile Trp Trp
        1155                1160                1165
Asn Ile Arg Lys Thr Cys Tyr Lys Ile Val Glu His Ser Trp Phe Glu
    1170                1175                1180
Ser Phe Ile Val Leu Met Ile Leu Leu Ser Ser Gly Ala Leu Ala Phe
1185                1190                1195                1200
Glu Asp Ile Tyr Ile Glu Arg Lys Lys Thr Ile Lys Ile Ile Leu Glu
                1205                1210                1215
Tyr Ala Asp Lys Ile Phe Thr Tyr Ile Phe Ile Leu Glu Met Leu Leu
            1220                1225                1230
Lys Trp Ile Ala Tyr Gly Tyr Lys Thr Tyr Phe Thr Asn Ala Trp Cys
        1235                1240                1245
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Trp Leu Asp Phe Leu Ile Val Asp Val Ser Leu Val Thr Leu Val Ala
    1250                1255                1260
Asn Thr Leu Gly Tyr Ser Asp Leu Gly Pro Ile Lys Ser Leu Arg Thr
1265                1270                1275                1280
Leu Arg Ala Leu Arg Pro Leu Arg Ala Leu Ser Arg Phe Glu Gly Met
                1285                1290                1295
Arg Val Val Val Asn Ala Leu Ile Gly Ala Ile Pro Ser Ile Met Asn
            1300                1305                1310
Val Leu Leu Val Cys Leu Ile Phe Trp Leu Ile Phe Ser Ile Met Gly
        1315                1320                1325
Val Asn Leu Phe Ala Gly Lys Phe Tyr Glu Cys Ile Asn Thr Thr Asp
    1330                1335                1340
Gly Ser Arg Phe Pro Ala Ser Gln Val Pro Asn Arg Ser Glu Cys Phe
1345                1350                1355                1360
Ala Leu Met Asn Val Ser Gln Asn Val Arg Trp Lys Asn Leu Lys Val
                1365                1370                1375
Asn Phe Asp Asn Val Gly Leu Gly Tyr Leu Ser Leu Leu Gln Val Ala
            1380                1385                1390
Thr Phe Lys Gly Trp Thr Ile Ile Met Tyr Ala Ala Val Asp Ser Val
        1395                1400                1405
Asn Val Asp Lys Gln Pro Lys Tyr Glu Tyr Ser Leu Tyr Met Tyr Ile
    1410                1415                1420
Tyr Phe Val Val Phe Ile Ile Phe Gly Ser Phe Phe Thr Leu Asn Leu
1425                1430                1435                1440
Phe Ile Gly Val Ile Ile Asp Asn Phe Asn Gln Gln Lys Lys Lys Leu
                1445                1450                1455
Gly Gly Gln Asp Ile Phe Met Thr Glu Glu Gln Lys Lys Tyr Tyr Asn
            1460                1465                1470
Ala Met Lys Lys Leu Gly Ser Lys Lys Pro Gln Lys Pro Ile Pro Arg
        1475                1480                1485
Pro Gly Asn Lys Ile Gln Gly Cys Ile Phe Asp Leu Val Thr Asn Gln
    1490                1495                1500
Ala Phe Asp Ile Ser Ile Met Val Leu Ile Cys Leu Asn Met Val Thr
1505                1510                1515                1520
Met Met Val Glu Lys Glu Gly Gln Ser Gln His Met Thr Glu Val Leu
                1525                1530                1535
Tyr Trp Ile Asn Val Val Phe Ile Ile Leu Phe Thr Gly Glu Cys Val
            1540                1545                1550
Leu Lys Leu Ile Ser Leu Arg His Tyr Tyr Phe Thr Val Gly Trp Asn
        1555                1560                1565
Ile Phe Asp Phe Val Val Val Ile Ile Ser Ile Val Gly Met Phe Leu
    1570                1575                1580
Ala Asp Leu Ile Glu Thr Tyr Phe Val Ser Pro Thr Leu Phe Arg Val
1585                1590                1595                1600
Ile Arg Leu Ala Arg Ile Gly Arg Ile Leu Arg Leu Val Lys Gly Ala
                1605                1610                1615
Lys Gly Ile Arg Thr Leu Leu Phe Ala Leu Met Met Ser Leu Pro Ala
            1620                1625                1630
Leu Phe Asn Ile Gly Leu Leu Leu Phe Leu Val Met Phe Ile Tyr Ala
        1635                1640                1645
Ile Phe Gly Met Ser Asn Phe Ala Tyr Val Lys Lys Glu Asp Gly Ile
    1650                1655                1660
Asn Asp Met Phe Asn Phe Glu Thr Phe Gly Asn Ser Met Ile Cys Leu
1665                1670                1675                1680
Phe Gln Ile Thr Thr Ser Ala Gly Trp Asp Gly Leu Leu Ala Pro Ile
                1685                1690                1695
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Leu Asn Ser Lys Pro Pro Asp Cys Asp Pro Lys Lys Val His Pro Gly
            1700                1705                1710
Ser Ser Val Glu Gly Asp Cys Gly Asn Pro Ser Val Gly Ile Phe Tyr
        1715                1720                1725
Phe Val Ser Tyr Ile Ile Ile Ser Phe Leu Val Val Val Asn Met Tyr
    1730                1735                1740
Ile Ala Val Ile Leu Glu Asn Phe Ser Val Ala Thr Glu Glu Ser Thr
1745                1750                1755                1760
Glu Pro Leu Ser Glu Asp Asp Phe Glu Met Phe Tyr Glu Val Trp Glu
                1765                1770                1775
Lys Phe Asp Pro Asp Ala Thr Gln Phe Ile Glu Phe Ser Lys Leu Ser
            1780                1785                1790
Asp Phe Ala Ala Ala Leu Asp Pro Pro Leu Leu Ile Ala Lys Pro Asn
        1795                1800                1805
Lys Val Gln Leu Ile Ala Met Asp Leu Pro Met Val Ser Gly Asp Arg
    1810                1815                1820
Ile His Cys Leu Asp Ile Leu Phe Ala Phe Thr Lys Arg Val Leu Gly
1825                1830                1835                1840
Glu Ser Gly Glu Met Asp Ser Leu Arg Ser Gln Met Glu Glu Arg Phe
                1845                1850                1855
Met Ser Ala Asn Pro Ser Lys Val Ser Tyr Glu Pro Ile Thr Thr Thr
            1860                1865                1870
Leu Lys Arg Lys Gln Glu Asp Val Ser Ala Thr Val Ile Gln Arg Ala
        1875                1880                1885
Tyr Arg Arg Tyr Arg Leu Arg Gln Asn Val Lys Asn Ile Ser Ser Ile
    1890                1895                1900
Tyr Ile Lys Asp Gly Asp Arg Asp Asp Asp Leu Leu Asn Lys Lys Asp
1905                1910                1915                1920
Met Ala Phe Asp Asn Val Asn Glu Asn Ser Ser Pro Glu Lys Thr Asp
                1925                1930                1935
Ala Thr Ser Ser Thr Thr Ser Pro Pro Ser Tyr Asp Ser Val Thr Lys
            1940                1945                1950
Pro Asp Lys Glu Lys Tyr Glu Gln Asp Arg Thr Glu Lys Glu Asp Lys
        1955                1960                1965
Gly Lys Asp Ser Lys Glu Ser Lys Lys
    1970                1975


<210> 6
<211> 1977
<212> PRT
<213> Homo Sapien


<400> 6
Met Ala Met Leu Pro Pro Pro Gly Pro Gln Ser Phe Val His Phe Thr
 1               5                  10                  15
Lys Gln Ser Leu Ala Leu Ile Glu Gln Arg Ile Ala Glu Arg Lys Ser
            20                  25                  30
Lys Glu Pro Lys Glu Glu Lys Lys Asp Asp Asp Glu Glu Ala Pro Lys
        35                  40                  45
Pro Ser Ser Asp Leu Glu Ala Gly Lys Gln Leu Pro Phe Ile Tyr Gly
    50                  55                  60
Asp Ile Pro Pro Gly Met Val Ser Glu Pro Leu Glu Asp Leu Asp Pro
65                  70                  75                  80
Tyr Tyr Ala Asp Lys Lys Thr Phe Ile Val Leu Asn Lys Gly Lys Thr
```

```
                85                  90                  95
Ile Phe Arg Phe Asn Ala Thr Pro Ala Leu Tyr Met Leu Ser Pro Phe
            100                 105                 110
Ser Pro Leu Arg Arg Ile Ser Ile Lys Ile Leu Val His Ser Leu Phe
        115                 120                 125
Ser Met Leu Ile Met Cys Thr Ile Leu Thr Asn Cys Ile Phe Met Thr
    130                 135                 140
Met Asn Asn Pro Pro Asp Trp Thr Lys Asn Val Glu Tyr Thr Phe Thr
145                 150                 155                 160
Gly Ile Tyr Thr Phe Glu Ser Leu Val Lys Ile Leu Ala Arg Gly Phe
                165                 170                 175
Cys Val Gly Glu Phe Thr Phe Leu Arg Asp Pro Trp Asn Trp Leu Asp
            180                 185                 190
Phe Val Val Ile Val Phe Ala Tyr Leu Thr Glu Phe Val Asn Leu Gly
        195                 200                 205
Asn Val Ser Ala Leu Arg Thr Phe Arg Val Leu Arg Ala Leu Lys Thr
    210                 215                 220
Ile Ser Val Ile Pro Gly Leu Lys Thr Ile Val Gly Ala Leu Ile Gln
225                 230                 235                 240
Ser Val Lys Lys Leu Ser Asp Val Met Ile Leu Thr Val Phe Cys Leu
                245                 250                 255
Ser Val Phe Ala Leu Ile Gly Leu Gln Leu Phe Met Gly Asn Leu Lys
            260                 265                 270
His Lys Cys Phe Arg Asn Ser Leu Glu Asn Asn Glu Thr Leu Glu Ser
        275                 280                 285
Ile Met Asn Thr Leu Glu Ser Glu Glu Asp Phe Arg Lys Tyr Phe Tyr
    290                 295                 300
Tyr Leu Glu Gly Ser Lys Asp Ala Leu Leu Cys Gly Phe Ser Thr Asp
305                 310                 315                 320
Ser Gly Gln Cys Pro Glu Gly Tyr Thr Cys Val Lys Ile Gly Arg Asn
                325                 330                 335
Pro Asp Tyr Gly Tyr Thr Ser Phe Asp Thr Phe Ser Trp Ala Phe Leu
            340                 345                 350
Ala Leu Phe Arg Leu Met Thr Gln Asp Tyr Trp Glu Asn Leu Tyr Gln
        355                 360                 365
Gln Thr Leu Arg Ala Ala Gly Lys Thr Tyr Met Ile Phe Phe Val Val
    370                 375                 380
Val Ile Phe Leu Gly Ser Phe Tyr Leu Ile Asn Leu Ile Leu Ala Val
385                 390                 395                 400
Val Ala Met Ala Tyr Glu Glu Gln Asn Gln Ala Asn Ile Glu Glu Ala
                405                 410                 415
Lys Gln Lys Glu Leu Glu Phe Gln Gln Met Leu Asp Arg Leu Lys Lys
            420                 425                 430
Glu Gln Glu Glu Ala Glu Ala Ile Ala Ala Ala Ala Ala Glu Tyr Thr
        435                 440                 445
Ser Ile Arg Arg Ser Arg Ile Met Gly Leu Ser Glu Ser Ser Ser Glu
    450                 455                 460
Thr Ser Lys Leu Ser Ser Lys Ser Ala Lys Glu Arg Arg Asn Arg Arg
465                 470                 475                 480
Lys Lys Lys Asn Gln Lys Lys Leu Ser Ser Gly Glu Glu Lys Gly Asp
                485                 490                 495
Ala Glu Lys Leu Ser Lys Ser Glu Ser Glu Asp Ser Ile Arg Arg Lys
            500                 505                 510
Ser Phe His Leu Gly Val Glu Gly His Arg Arg Ala His Glu Lys Arg
        515                 520                 525
Leu Ser Thr Pro Asn Gln Ser Pro Leu Ser Ile Arg Gly Ser Leu Phe
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    530                 535                 540
Ser Ala Arg Arg Ser Ser Arg Thr Ser Leu Phe Ser Phe Lys Gly Arg
545                 550                 555                 560
Gly Arg Asp Ile Gly Ser Glu Thr Glu Phe Ala Asp Asp Glu His Ser
                565                 570                 575
Ile Phe Gly Asp Asn Glu Ser Arg Arg Gly Ser Leu Phe Val Pro His
            580                 585                 590
Arg Pro Gln Glu Arg Arg Ser Ser Asn Ile Ser Gln Ala Ser Arg Ser
        595                 600                 605
Pro Pro Met Leu Pro Val Asn Gly Lys Met His Ser Ala Val Asp Cys
    610                 615                 620
Asn Gly Val Val Ser Leu Val Asp Gly Arg Ser Ala Leu Met Leu Pro
625                 630                 635                 640
Asn Gly Gln Leu Leu Pro Glu Gly Thr Thr Asn Gln Ile His Lys Lys
                645                 650                 655
Arg Arg Cys Ser Ser Tyr Leu Leu Ser Glu Asp Met Leu Asn Asp Pro
            660                 665                 670
Asn Leu Arg Gln Arg Ala Met Ser Arg Ala Ser Ile Leu Thr Asn Thr
        675                 680                 685
Val Glu Glu Leu Glu Glu Ser Arg Gln Lys Cys Pro Pro Trp Trp Tyr
    690                 695                 700
Arg Phe Ala His Lys Phe Leu Ile Trp Asn Cys Ser Pro Tyr Trp Ile
705                 710                 715                 720
Lys Phe Lys Lys Cys Ile Tyr Phe Ile Val Met Asp Pro Phe Val Asp
                725                 730                 735
Leu Ala Val Thr Ile Cys Ile Val Leu Asn Thr Leu Phe Met Ala Met
            740                 745                 750
Glu His His Pro Met Thr Glu Glu Phe Lys Asn Val Leu Ala Ile Gly
        755                 760                 765
Asn Leu Val Phe Thr Gly Ile Phe Ala Ala Glu Met Val Leu Lys Leu
    770                 775                 780
Ile Ala Met Asp Pro Tyr Glu Tyr Phe Gln Val Gly Trp Asn Ile Phe
785                 790                 795                 800
Asp Ser Leu Ile Val Thr Leu Ser Leu Val Glu Leu Phe Leu Ala Asp
                805                 810                 815
Val Glu Gly Leu Ser Val Leu Arg Ser Phe Arg Leu Leu Arg Val Phe
            820                 825                 830
Lys Leu Ala Lys Ser Trp Pro Thr Leu Asn Met Leu Ile Lys Ile Ile
        835                 840                 845
Gly Asn Ser Val Gly Ala Leu Gly Asn Leu Thr Leu Val Leu Ala Ile
    850                 855                 860
Ile Val Phe Ile Phe Ala Val Val Gly Met Gln Leu Phe Gly Lys Ser
865                 870                 875                 880
Tyr Lys Glu Cys Val Cys Lys Ile Asn Asp Asp Cys Thr Leu Pro Arg
                885                 890                 895
Trp His Met Asn Asp Phe Phe His Ser Phe Leu Ile Val Phe Arg Val
            900                 905                 910
Leu Cys Gly Glu Trp Ile Glu Thr Met Trp Asp Cys Met Glu Val Ala
        915                 920                 925
Gly Gln Ala Met Cys Leu Ile Val Tyr Met Met Val Met Val Ile Gly
    930                 935                 940
Asn Leu Val Val Leu Asn Leu Phe Leu Ala Leu Leu Leu Ser Ser Phe
945                 950                 955                 960
Ser Ser Asp Asn Leu Thr Ala Ile Glu Glu Asp Pro Asp Ala Asn Asn
                965                 970                 975
Leu Gln Ile Ala Val Thr Arg Ile Lys Lys Gly Ile Asn Tyr Val Lys
```

```
            980                 985                 990
Gln Thr Leu Arg Glu Phe Ile Leu Lys Ala Phe Ser Lys Lys Pro Lys
        995                1000                1005
Ile Ser Arg Glu Ile Arg Gln Ala Glu Asp Leu Asn Thr Lys Lys Glu
    1010                1015                1020
Asn Tyr Ile Ser Asn His Thr Leu Ala Glu Met Ser Lys Gly His Asn
1025                1030                1035                1040
Phe Leu Lys Glu Lys Asp Lys Ile Ser Gly Phe Gly Ser Ser Val Asp
                1045                1050                1055
Lys His Leu Met Glu Asp Ser Asp Gly Gln Ser Phe Ile His Asn Pro
            1060                1065                1070
Ser Leu Thr Val Thr Val Pro Ile Ala Pro Gly Glu Ser Asp Leu Glu
        1075                1080                1085
Asn Met Asn Ala Glu Glu Leu Ser Ser Asp Ser Asp Ser Glu Tyr Ser
    1090                1095                1100
Lys Val Arg Leu Asn Arg Ser Ser Ser Ser Glu Cys Ser Thr Val Asp
1105                1110                1115                1120
Asn Pro Leu Pro Gly Glu Gly Glu Glu Ala Glu Ala Glu Pro Met Asn
                1125                1130                1135
Ser Asp Glu Pro Glu Ala Cys Phe Thr Asp Gly Cys Val Arg Arg Phe
            1140                1145                1150
Ser Cys Cys Gln Val Asn Ile Glu Ser Gly Lys Gly Lys Ile Trp Trp
        1155                1160                1165
Asn Ile Arg Lys Thr Cys Tyr Lys Ile Val Glu His Ser Trp Phe Glu
    1170                1175                1180
Ser Phe Ile Val Leu Met Ile Leu Leu Ser Ser Gly Ala Leu Ala Phe
1185                1190                1195                1200
Glu Asp Ile Tyr Ile Glu Arg Lys Lys Thr Ile Lys Ile Ile Leu Glu
                1205                1210                1215
Tyr Ala Asp Lys Ile Phe Thr Tyr Ile Phe Ile Leu Glu Met Leu Leu
            1220                1225                1230
Lys Trp Ile Ala Tyr Gly Tyr Lys Thr Tyr Phe Thr Asn Ala Trp Cys
        1235                1240                1245
Trp Leu Asp Phe Leu Ile Val Asp Val Ser Leu Val Thr Leu Val Ala
    1250                1255                1260
Asn Thr Leu Gly Tyr Ser Asp Leu Gly Pro Ile Lys Ser Leu Arg Thr
1265                1270                1275                1280
Leu Arg Ala Leu Arg Pro Leu Arg Ala Leu Ser Arg Phe Glu Gly Met
                1285                1290                1295
Arg Val Val Val Asn Ala Leu Ile Gly Ala Ile Pro Ser Ile Met Asn
            1300                1305                1310
Val Leu Leu Val Cys Leu Ile Phe Trp Leu Ile Phe Ser Ile Met Gly
        1315                1320                1325
Val Asn Leu Phe Ala Gly Lys Phe Tyr Glu Cys Ile Asn Thr Thr Asp
    1330                1335                1340
Gly Ser Arg Phe Pro Ala Ser Gln Val Pro Asn Arg Ser Glu Cys Phe
1345                1350                1355                1360
Ala Leu Met Asn Val Ser Gln Asn Val Arg Trp Lys Asn Leu Lys Val
                1365                1370                1375
Asn Phe Asp Asn Val Gly Leu Gly Tyr Leu Ser Leu Leu Gln Val Ala
            1380                1385                1390
Thr Phe Lys Gly Trp Thr Ile Ile Met Tyr Ala Ala Val Asp Ser Val
        1395                1400                1405
Asn Val Asp Lys Gln Pro Lys Tyr Glu Tyr Ser Leu Tyr Met Tyr Ile
    1410                1415                1420
Tyr Phe Val Val Phe Ile Ile Phe Gly Ser Phe Phe Thr Leu Asn Leu
```

1425 1430 1435 1440
Phe Ile Gly Val Ile Ile Asp Asn Phe Asn Gln Gln Lys Lys Lys Leu
1445 1450 1455
Gly Gly Gln Asp Ile Phe Met Thr Glu Glu Gln Lys Lys Tyr Tyr Asn
1460 1465 1470
Ala Met Lys Lys Leu Gly Ser Lys Lys Pro Gln Lys Pro Ile Pro Arg
1475 1480 1485
Pro Gly Asn Lys Ile Gln Gly Cys Ile Phe Asp Leu Val Thr Asn Gln
1490 1495 1500
Ala Phe Asp Ile Ser Ile Met Val Leu Ile Cys Leu Asn Met Val Thr
1505 1510 1515 1520
Met Met Val Glu Lys Glu Gly Gln Ser Gln His Met Thr Glu Val Leu
1525 1530 1535
Tyr Trp Ile Asn Val Val Phe Ile Ile Leu Phe Thr Gly Glu Cys Val
1540 1545 1550
Leu Lys Leu Ile Ser Leu Arg His Tyr Tyr Phe Thr Val Gly Trp Asn
1555 1560 1565
Ile Phe Asp Phe Val Val Val Ile Ile Ser Ile Val Gly Met Phe Leu
1570 1575 1580
Ala Asp Leu Ile Glu Thr Tyr Phe Val Ser Pro Thr Leu Phe Arg Val
1585 1590 1595 1600
Ile Arg Leu Ala Arg Ile Gly Arg Ile Leu Arg Leu Val Lys Gly Ala
1605 1610 1615
Lys Gly Ile Arg Thr Leu Leu Phe Ala Leu Met Met Ser Leu Pro Ala
1620 1625 1630
Leu Phe Asn Ile Gly Leu Leu Leu Phe Leu Val Met Phe Ile Tyr Ala
1635 1640 1645
Ile Phe Gly Met Ser Asn Phe Ala Tyr Val Lys Lys Glu Asp Gly Ile
1650 1655 1660
Asn Asp Met Phe Asn Phe Glu Thr Phe Gly Asn Ser Met Ile Cys Leu
1665 1670 1675 1680
Phe Gln Ile Thr Thr Ser Ala Gly Trp Asp Gly Leu Leu Ala Pro Ile
1685 1690 1695
Leu Asn Ser Lys Pro Pro Asp Cys Asp Pro Lys Lys Val His Pro Gly
1700 1705 1710
Ser Ser Val Glu Gly Asp Cys Gly Asn Pro Ser Val Gly Ile Phe Tyr
1715 1720 1725
Phe Val Ser Tyr Ile Ile Ile Ser Phe Leu Val Val Val Asn Met Tyr
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Ile Ala Val Ile Leu Glu Asn Phe Ser Val Ala Thr Glu Glu Ser Thr
1745 1750 1755 1760
Glu Pro Leu Ser Glu Asp Asp Phe Glu Met Phe Tyr Glu Val Trp Glu
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Lys Phe Asp Pro Asp Ala Thr Gln Phe Ile Glu Phe Ser Lys Leu Ser
1780 1785 1790
Asp Phe Ala Ala Ala Leu Asp Pro Pro Leu Leu Ile Ala Lys Pro Asn
1795 1800 1805
Lys Val Gln Leu Ile Ala Met Asp Leu Pro Met Val Ser Gly Asp Arg
1810 1815 1820
Ile His Cys Leu Asp Ile Leu Phe Ala Phe Thr Lys Arg Val Leu Gly
1825 1830 1835 1840
Glu Ser Gly Glu Met Asp Ser Leu Arg Ser Gln Met Glu Glu Arg Phe
1845 1850 1855
Met Ser Ala Asn Pro Ser Lys Val Ser Tyr Glu Pro Ile Thr Thr Thr
1860 1865 1870
Leu Lys Arg Lys Gln Glu Asp Val Ser Ala Thr Val Ile Gln Arg Ala

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        1875                1880                1885
Tyr Arg Arg Tyr Arg Leu Arg Gln Asn Val Lys Asn Ile Ser Ser Ile
    1890                1895                1900
Tyr Ile Lys Asp Gly Asp Arg Asp Asp Asp Leu Leu Asn Lys Lys Asp
1905                1910                1915                1920
Met Ala Phe Asp Asn Val Asn Glu Asn Ser Ser Pro Glu Lys Thr Asp
                1925                1930                1935
Ala Thr Ser Ser Thr Thr Ser Pro Pro Ser Tyr Asp Ser Val Thr Lys
            1940                1945                1950
Pro Asp Lys Glu Lys Tyr Glu Gln Asp Arg Thr Glu Lys Glu Asp Lys
        1955                1960                1965
Gly Lys Asp Ser Lys Glu Ser Lys Lys
    1970                1975
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<211> 1977
<212> PRT
<213> Homo Sapien

<400> 7

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            20                  25                  30
Lys Glu Pro Lys Glu Glu Lys Lys Asp Asp Asp Glu Glu Ala Pro Lys
        35                  40                  45
Pro Ser Ser Asp Leu Glu Ala Gly Lys Gln Leu Pro Phe Ile Tyr Gly
    50                  55                  60
Asp Ile Pro Pro Gly Met Val Ser Glu Pro Leu Glu Asp Leu Asp Pro
65                  70                  75                  80
Tyr Tyr Ala Asp Lys Lys Thr Phe Ile Val Leu Asn Lys Gly Lys Thr
                85                  90                  95
Ile Phe Arg Phe Asn Ala Thr Pro Ala Leu Tyr Met Leu Ser Pro Phe
            100                 105                 110
Ser Pro Leu Arg Arg Ile Ser Ile Lys Ile Leu Val His Ser Leu Phe
        115                 120                 125
Ser Met Leu Ile Met Cys Thr Ile Leu Thr Asn Cys Ile Phe Met Thr
    130                 135                 140
Met Asn Asn Pro Pro Asp Trp Thr Lys Asn Val Glu Tyr Thr Phe Thr
145                 150                 155                 160
Gly Ile Tyr Thr Phe Glu Ser Leu Val Lys Ile Leu Ala Arg Gly Phe
                165                 170                 175
Cys Val Gly Glu Phe Thr Phe Leu Arg Asp Pro Trp Asn Trp Leu Asp
            180                 185                 190
Phe Val Val Ile Val Phe Ala Tyr Leu Thr Glu Phe Val Asn Leu Gly
        195                 200                 205
Asn Val Ser Ala Leu Arg Thr Phe Arg Val Leu Arg Ala Leu Lys Thr
    210                 215                 220
Ile Ser Val Ile Pro Gly Leu Lys Thr Ile Val Gly Ala Leu Ile Gln
225                 230                 235                 240
Ser Val Lys Lys Leu Ser Asp Val Met Ile Leu Thr Val Phe Cys Leu
                245                 250                 255
Ser Val Phe Ala Leu Ile Gly Leu Gln Leu Phe Met Gly Asn Leu Lys
            260                 265                 270
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His Lys Cys Phe Arg Asn Ser Leu Glu Asn Asn Glu Thr Leu Glu Ser
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Ile Met Asn Thr Leu Glu Ser Glu Glu Asp Phe Arg Lys Tyr Phe Tyr
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Tyr Leu Glu Gly Ser Lys Asp Ala Leu Leu Cys Gly Phe Ser Thr Asp
305                 310                 315                 320
Ser Gly Gln Cys Pro Glu Gly Tyr Thr Cys Val Lys Ile Gly Arg Asn
                325                 330                 335
Pro Asp Tyr Gly Tyr Thr Ser Phe Asp Thr Phe Ser Trp Ala Phe Leu
            340                 345                 350
Ala Leu Phe Arg Leu Met Thr Gln Asp Tyr Trp Glu Asn Leu Tyr Gln
        355                 360                 365
Gln Thr Leu Arg Ala Ala Gly Lys Thr Tyr Met Ile Phe Phe Val Val
    370                 375                 380
Val Ile Phe Leu Gly Ser Phe Tyr Leu Ile Asn Leu Ile Leu Ala Val
385                 390                 395                 400
Val Ala Met Ala Tyr Glu Glu Gln Asn Gln Ala Asn Ile Glu Glu Ala
                405                 410                 415
Lys Gln Lys Glu Leu Glu Phe Gln Gln Met Leu Asp Arg Leu Lys Lys
            420                 425                 430
Glu Gln Glu Glu Ala Glu Ala Ile Ala Ala Ala Ala Ala Glu Tyr Thr
        435                 440                 445
Ser Ile Arg Arg Ser Arg Ile Met Gly Leu Ser Glu Ser Ser Ser Glu
    450                 455                 460
Thr Ser Lys Leu Ser Ser Lys Ser Ala Lys Glu Arg Arg Asn Arg Arg
465                 470                 475                 480
Lys Lys Lys Asn Gln Lys Lys Leu Ser Ser Gly Glu Glu Lys Gly Asp
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Ala Glu Lys Leu Ser Lys Ser Glu Ser Glu Asp Ser Ile Arg Arg Lys
            500                 505                 510
Ser Phe His Leu Gly Val Glu Gly His Arg Arg Ala His Glu Lys Arg
        515                 520                 525
Leu Ser Thr Pro Asn Gln Ser Pro Leu Ser Ile Arg Gly Ser Leu Phe
    530                 535                 540
Ser Ala Arg Arg Ser Ser Arg Thr Ser Leu Phe Ser Phe Lys Gly Arg
545                 550                 555                 560
Gly Arg Asp Ile Gly Ser Glu Thr Glu Phe Ala Asp Asp Glu His Ser
                565                 570                 575
Ile Phe Gly Asp Asn Glu Ser Arg Arg Gly Ser Leu Phe Val Pro His
            580                 585                 590
Arg Pro Gln Glu Arg Arg Ser Ser Asn Ile Ser Gln Ala Ser Arg Ser
        595                 600                 605
Pro Pro Met Leu Pro Val Asn Gly Lys Met His Ser Ala Val Asp Cys
    610                 615                 620
Asn Gly Val Val Ser Leu Val Asp Gly Arg Ser Ala Leu Met Leu Pro
625                 630                 635                 640
Asn Gly Gln Leu Leu Pro Glu Gly Thr Thr Asn Gln Ile His Lys Lys
                645                 650                 655
Arg Arg Cys Ser Ser Tyr Leu Leu Ser Glu Asp Met Leu Asn Asp Pro
            660                 665                 670
Asn Leu Arg Gln Arg Ala Met Ser Arg Ala Ser Ile Leu Thr Asn Thr
        675                 680                 685
Val Glu Glu Leu Glu Glu Ser Arg Gln Lys Cys Pro Pro Trp Trp Tyr
    690                 695                 700
Arg Phe Ala His Lys Phe Leu Ile Trp Asn Cys Ser Pro Tyr Trp Ile
705                 710                 715                 720
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Lys Phe Lys Lys Cys Ile Tyr Phe Ile Val Met Asp Pro Phe Val Asp
                725                 730                 735
Leu Ala Ile Thr Ile Cys Ile Val Leu Asn Thr Leu Phe Met Ala Met
            740                 745                 750
Glu His His Pro Met Thr Glu Glu Phe Lys Asn Val Leu Ala Ile Gly
        755                 760                 765
Asn Leu Val Phe Thr Gly Ile Phe Ala Ala Glu Met Val Leu Lys Leu
    770                 775                 780
Ile Ala Met Asp Pro Tyr Glu Tyr Phe Gln Val Gly Trp Asn Ile Phe
785                 790                 795                 800
Asp Ser Leu Ile Val Thr Leu Ser Leu Val Glu Leu Phe Leu Ala Asp
                805                 810                 815
Val Glu Gly Leu Ser Val Leu Arg Ser Phe Arg Leu Leu Arg Val Phe
            820                 825                 830
Lys Leu Ala Lys Ser Trp Pro Thr Leu Asn Met Leu Ile Lys Ile Ile
        835                 840                 845
Gly Asn Ser Val Gly Ala Leu Gly Asn Leu Thr Leu Val Leu Ala Ile
    850                 855                 860
Ile Val Phe Ile Phe Ala Val Val Gly Met Gln Leu Phe Gly Lys Ser
865                 870                 875                 880
Tyr Lys Glu Cys Val Cys Lys Ile Asn Asp Asp Cys Thr Leu Pro Arg
                885                 890                 895
Trp His Met Asn Asp Phe Phe His Ser Phe Leu Ile Val Phe Arg Val
            900                 905                 910
Leu Cys Gly Glu Trp Ile Glu Thr Met Trp Asp Cys Met Glu Val Ala
        915                 920                 925
Gly Gln Ala Met Cys Leu Ile Val Tyr Met Met Val Met Val Ile Gly
    930                 935                 940
Asn Leu Val Val Leu Asn Leu Phe Leu Ala Leu Leu Leu Ser Ser Phe
945                 950                 955                 960
Ser Ser Asp Asn Leu Thr Ala Ile Glu Glu Asp Pro Asp Ala Asn Asn
                965                 970                 975
Leu Gln Ile Ala Val Thr Arg Ile Lys Lys Gly Ile Asn Tyr Val Lys
            980                 985                 990
Gln Thr Leu Arg Glu Phe Ile Leu Lys Ala Phe Ser Lys Lys Pro Lys
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Ile Ser Arg Glu Ile Arg Gln Ala Glu Asp Leu Asn Thr Lys Lys Glu
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Asn Tyr Ile Ser Asn His Thr Leu Ala Glu Met Ser Lys Gly His Asn
1025                1030                1035                1040
Phe Leu Lys Glu Lys Asp Lys Ile Ser Gly Phe Gly Ser Ser Val Asp
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Lys His Leu Met Glu Asp Ser Asp Gly Gln Ser Phe Ile His Asn Pro
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Ser Leu Thr Val Thr Val Pro Ile Ala Pro Gly Glu Ser Asp Leu Glu
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Asn Met Asn Ala Glu Glu Leu Ser Ser Asp Ser Asp Ser Glu Tyr Ser
    1090                1095                1100
Lys Val Arg Leu Asn Arg Ser Ser Ser Ser Glu Cys Ser Thr Val Asp
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                1125                1130                1135
Ser Asp Glu Pro Glu Ala Cys Phe Thr Asp Gly Cys Val Arg Arg Phe
            1140                1145                1150
Ser Cys Cys Gln Val Asn Ile Glu Ser Gly Lys Gly Lys Ile Trp Trp
        1155                1160                1165
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Ser Phe Ile Val Leu Met Ile Leu Leu Ser Ser Gly Ala Leu Ala Phe
1185                1190                1195                1200
Glu Asp Ile Tyr Ile Glu Arg Lys Lys Thr Ile Lys Ile Ile Leu Glu
                1205                1210                1215
Tyr Ala Asp Lys Ile Phe Thr Tyr Ile Phe Ile Leu Glu Met Leu Leu
            1220                1225                1230
Lys Trp Ile Ala Tyr Gly Tyr Lys Thr Tyr Phe Thr Asn Ala Trp Cys
        1235                1240                1245
Trp Leu Asp Phe Leu Ile Val Asp Val Ser Leu Val Thr Leu Val Ala
    1250                1255                1260
Asn Thr Leu Gly Tyr Ser Asp Leu Gly Pro Ile Lys Ser Leu Arg Thr
1265                1270                1275                1280
Leu Arg Ala Leu Arg Pro Leu Arg Ala Leu Ser Arg Phe Glu Gly Met
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Arg Val Val Val Asn Ala Leu Ile Gly Ala Ile Pro Ser Ile Met Asn
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Val Leu Leu Val Cys Leu Ile Phe Trp Leu Ile Phe Ser Ile Met Gly
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Val Asn Leu Phe Ala Gly Lys Phe Tyr Glu Cys Ile Asn Thr Thr Asp
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Gly Ser Arg Phe Pro Ala Ser Gln Val Pro Asn Arg Ser Glu Cys Phe
1345                1350                1355                1360
Ala Leu Met Asn Val Ser Gln Asn Val Arg Trp Lys Asn Leu Lys Val
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Asn Phe Asp Asn Val Gly Leu Gly Tyr Leu Ser Leu Leu Gln Val Ala
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Thr Phe Lys Gly Trp Thr Ile Ile Met Tyr Ala Ala Val Asp Ser Val
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Asn Val Asp Lys Gln Pro Lys Tyr Glu Tyr Ser Leu Tyr Met Tyr Ile
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Tyr Phe Val Val Phe Ile Ile Phe Gly Ser Phe Phe Thr Leu Asn Leu
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Phe Ile Gly Val Ile Ile Asp Asn Phe Asn Gln Gln Lys Lys Lys Leu
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Gly Gly Gln Asp Ile Phe Met Thr Glu Glu Gln Lys Lys Tyr Tyr Asn
            1460                1465                1470
Ala Met Lys Lys Leu Gly Ser Lys Lys Pro Gln Lys Pro Ile Pro Arg
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Pro Gly Asn Lys Ile Gln Gly Cys Ile Phe Asp Leu Val Thr Asn Gln
    1490                1495                1500
Ala Phe Asp Ile Ser Ile Met Val Leu Ile Cys Leu Asn Met Val Thr
1505                1510                1515                1520
Met Met Val Glu Lys Glu Gly Gln Ser Gln His Met Thr Glu Val Leu
                1525                1530                1535
Tyr Trp Ile Asn Val Val Phe Ile Ile Leu Phe Thr Gly Glu Cys Val
            1540                1545                1550
Leu Lys Leu Ile Ser Leu Arg His Tyr Tyr Phe Thr Val Gly Trp Asn
        1555                1560                1565
Ile Phe Asp Phe Val Val Val Ile Ile Ser Ile Val Gly Met Phe Leu
    1570                1575                1580
Ala Asp Leu Ile Glu Thr Tyr Phe Val Ser Pro Thr Leu Phe Arg Val
1585                1590                1595                1600
Ile Arg Leu Ala Arg Ile Gly Arg Ile Leu Arg Leu Val Lys Gly Ala
                1605                1610                1615
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Lys Gly Ile Arg Thr Leu Leu Phe Ala Leu Met Met Ser Leu Pro Ala
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Leu Phe Asn Ile Gly Leu Leu Leu Phe Leu Val Met Phe Ile Tyr Ala
        1635                1640                1645
Ile Phe Gly Met Ser Asn Phe Ala Tyr Val Lys Lys Glu Asp Gly Ile
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Asn Asp Met Phe Asn Phe Glu Thr Phe Gly Asn Ser Met Ile Cys Leu
1665                1670                1675                1680
Phe Gln Ile Thr Thr Ser Ala Gly Trp Asp Gly Leu Leu Ala Pro Ile
                1685                1690                1695
Leu Asn Ser Lys Pro Pro Asp Cys Asp Pro Lys Lys Val His Pro Gly
            1700                1705                1710
Ser Ser Val Glu Gly Asp Cys Gly Asn Pro Ser Val Gly Ile Phe Tyr
        1715                1720                1725
Phe Val Ser Tyr Ile Ile Ile Ser Phe Leu Val Val Val Asn Met Tyr
    1730                1735                1740
Ile Ala Val Ile Leu Glu Asn Phe Ser Val Ala Thr Glu Glu Ser Thr
1745                1750                1755                1760
Glu Pro Leu Ser Glu Asp Asp Phe Glu Met Phe Tyr Glu Val Trp Glu
                1765                1770                1775
Lys Phe Asp Pro Asp Ala Thr Gln Phe Ile Glu Phe Ser Lys Leu Ser
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Asp Phe Ala Ala Ala Leu Asp Pro Pro Leu Leu Ile Ala Lys Pro Asn
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Lys Val Gln Leu Ile Ala Met Asp Leu Pro Met Val Ser Gly Asp Arg
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Ile His Cys Leu Asp Ile Leu Phe Ala Phe Thr Lys Arg Val Leu Gly
1825                1830                1835                1840
Glu Ser Gly Glu Met Asp Ser Leu Arg Ser Gln Met Glu Glu Arg Phe
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Met Ser Ala Asn Pro Ser Lys Val Ser Tyr Glu Pro Ile Thr Thr Thr
            1860                1865                1870
Leu Lys Arg Lys Gln Glu Asp Val Ser Ala Thr Val Ile Gln Arg Ala
        1875                1880                1885
Tyr Arg Arg Tyr Arg Leu Arg Gln Asn Val Lys Asn Ile Ser Ser Ile
    1890                1895                1900
Tyr Ile Lys Asp Gly Asp Arg Asp Asp Asp Leu Leu Asn Lys Lys Asp
1905                1910                1915                1920
Met Ala Phe Asp Asn Val Asn Glu Asn Ser Ser Pro Glu Lys Thr Asp
                1925                1930                1935
Ala Thr Ser Ser Thr Thr Ser Pro Pro Ser Tyr Asp Ser Val Thr Lys
            1940                1945                1950
Pro Asp Lys Glu Lys Tyr Glu Gln Asp Arg Thr Glu Lys Glu Asp Lys
        1955                1960                1965
Gly Lys Asp Ser Lys Glu Ser Lys Lys
    1970                1975


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<220>
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<220>
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synthetic construct

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<220>
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synthetic construct

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35 40 45
Pro Ser Ser Asp Leu Glu Ala Gly Lys Gln Leu Pro Phe Ile Tyr Gly
50 55 60
Asp Ile Pro Pro Gly Met Val Ser Glu Pro Leu Glu Asp Leu Asp Pro
65 70 75 80
Tyr Tyr Ala Asp Lys Lys Thr Phe Ile Val Leu Asn Lys Gly Lys Thr
85 90 95
Ile Phe Arg Phe Asn Ala Thr Pro Ala Leu Tyr Met Leu Ser Pro Phe
100 105 110
Ser Pro Leu Arg Arg Ile Ser Ile Lys Ile Leu Val His Ser Leu Phe
115 120 125
Ser Met Leu Ile Met Cys Thr Ile Leu Thr Asn Cys Ile Phe Met Thr
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Met Asn Asn Pro Pro Asp Trp Thr Lys Asn Val Glu Tyr Thr Phe Thr
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Gly Ile Tyr Thr Phe Glu Ser Leu Val Lys Ile Leu Ala Arg Gly Phe
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Cys Val Gly Glu Phe Thr Phe Leu Arg Asp Pro Trp Asn Trp Leu Asp
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Phe Val Val Ile Val Phe Ala Tyr Leu Thr Glu Phe Val Asn Leu Gly
195 200 205
Asn Val Ser Ala Leu Arg Thr Phe Arg Val Leu Arg Ala Leu Lys Thr
210 215 220
Ile Ser Val Ile Pro Gly Leu Lys Thr Ile Val Gly Ala Leu Ile Gln
225 230 235 240
Ser Val Lys Lys Leu Ser Asp Val Met Ile Leu Thr Val Phe Cys Leu
245 250 255
Ser Val Phe Ala Leu Ile Gly Leu Gln Leu Phe Met Gly Asn Leu Lys
260 265 270
His Lys Cys Phe Arg Asn Ser Leu Glu Asn Asn Glu Thr Leu Glu Ser
275 280 285
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290 295 300
Tyr Leu Glu Gly Ser Lys Asp Ala Leu Leu Cys Gly Phe Ser Thr Asp
305 310 315 320
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325 330 335
Pro Asp Tyr Gly Tyr Thr Ser Phe Asp Thr Phe Ser Trp Ala Phe Leu
340 345 350
Ala Leu Phe Arg Leu Met Thr Gln Asp Tyr Trp Glu Asn Leu Tyr Gln
355 360 365
Gln Thr Leu Arg Ala Ala Gly Lys Thr Tyr Met Ile Phe Phe Val Val
370 375 380
Val Ile Phe Leu Gly Ser Phe Tyr Leu Ile Asn Leu Ile Leu Ala Val

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Glu Gln Glu Glu Ala Glu Ala Ile Ala Ala Ala Ala Ala Glu Tyr Thr
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Ser Ile Arg Arg Ser Arg Ile Met Gly Leu Ser Glu Ser Ser Ser Glu
    450                 455                 460
Thr Ser Lys Leu Ser Ser Lys Ser Ala Lys Glu Arg Arg Asn Arg Arg
465                 470                 475                 480
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                485                 490                 495
Ala Glu Lys Leu Ser Lys Ser Glu Ser Glu Asp Ser Ile Arg Arg Lys
            500                 505                 510
Ser Phe His Leu Gly Val Glu Gly His Arg Arg Ala His Glu Lys Arg
        515                 520                 525
Leu Ser Thr Pro Asn Gln Ser Pro Leu Ser Ile Arg Gly Ser Leu Phe
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Ser Ala Arg Arg Ser Ser Arg Thr Ser Leu Phe Ser Phe Lys Gly Arg
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Gly Arg Asp Ile Gly Ser Glu Thr Glu Phe Ala Asp Asp Glu His Ser
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Arg Pro Gln Glu Arg Arg Ser Ser Asn Ile Ser Gln Ala Ser Arg Ser
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Pro Pro Met Leu Pro Val Asn Gly Lys Met His Ser Ala Val Asp Cys
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625                 630                 635                 640
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Arg Arg Cys Ser Ser Tyr Leu Leu Ser Glu Asp Met Leu Asn Asp Pro
            660                 665                 670
Asn Leu Arg Gln Arg Ala Met Ser Arg Ala Ser Ile Leu Thr Asn Thr
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Val Glu Glu Leu Glu Glu Ser Arg Gln Lys Cys Pro Pro Trp Trp Tyr
    690                 695                 700
Arg Phe Ala His Lys Phe Leu Ile Trp Asn Cys Ser Pro Tyr Trp Ile
705                 710                 715                 720
Lys Phe Lys Lys Cys Ile Tyr Phe Ile Val Met Asp Pro Phe Val Asp
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Leu Ala Ile Thr Ile Cys Ile Val Leu Asn Thr Leu Phe Met Ala Met
            740                 745                 750
Glu His His Pro Met Thr Glu Glu Phe Lys Asn Val Leu Ala Ile Gly
        755                 760                 765
Asn Leu Val Phe Thr Gly Ile Phe Ala Ala Glu Met Val Leu Lys Leu
    770                 775                 780
Ile Ala Met Asp Pro Tyr Glu Tyr Phe Gln Val Gly Trp Asn Ile Phe
785                 790                 795                 800
Asp Ser Leu Ile Val Thr Leu Ser Leu Val Glu Leu Phe Leu Ala Asp
                805                 810                 815
Val Glu Gly Leu Ser Val Leu Arg Ser Phe Arg Leu Leu Arg Val Phe
            820                 825                 830
Lys Leu Ala Lys Ser Trp Pro Thr Leu Asn Met Leu Ile Lys Ile Ile
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865                 870                 875                 880
Tyr Lys Glu Cys Val Cys Lys Ile Asn Asp Asp Cys Thr Leu Pro Arg
                885                 890                 895
Trp His Met Asn Asp Phe Phe His Ser Phe Leu Ile Val Phe Arg Val
            900                 905                 910
Leu Cys Gly Glu Trp Ile Glu Thr Met Trp Asp Cys Met Glu Val Ala
        915                 920                 925
Gly Gln Ala Met Cys Leu Ile Val Tyr Met Met Val Met Val Ile Gly
    930                 935                 940
Asn Leu Val Val Leu Asn Leu Phe Leu Ala Leu Leu Leu Ser Ser Phe
945                 950                 955                 960
Ser Ser Asp Asn Leu Thr Ala Ile Glu Glu Asp Pro Asp Ala Asn Asn
                965                 970                 975
Leu Gln Ile Ala Val Thr Arg Ile Lys Lys Gly Ile Asn Tyr Val Lys
            980                 985                 990
Gln Thr Leu Arg Glu Phe Ile Leu Lys Ala Phe Ser Lys Lys Pro Lys
        995                 1000                1005
Ile Ser Arg Glu Ile Arg Gln Ala Glu Asp Leu Asn Thr Lys Lys Glu
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Asn Tyr Ile Ser Asn His Thr Leu Ala Glu Met Ser Lys Gly His Asn
1025                1030                1035                1040
Phe Leu Lys Glu Lys Asp Lys Ile Ser Gly Phe Gly Ser Ser Val Asp
                1045                1050                1055
Lys His Leu Met Glu Asp Ser Asp Gly Gln Ser Phe Ile His Asn Pro
            1060                1065                1070
Ser Leu Thr Val Thr Val Pro Ile Ala Pro Gly Glu Ser Asp Leu Glu
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Asn Met Asn Ala Glu Glu Leu Ser Ser Asp Ser Asp Ser Glu Tyr Ser
    1090                1095                1100
Lys Val Arg Leu Asn Arg Ser Ser Ser Ser Glu Cys Ser Thr Val Asp
1105                1110                1115                1120
Asn Pro Leu Pro Gly Glu Gly Glu Glu Ala Glu Ala Glu Pro Met Asn
                1125                1130                1135
Ser Asp Glu Pro Glu Ala Cys Phe Thr Asp Gly Cys Val Arg Arg Phe
            1140                1145                1150
Ser Cys Cys Gln Val Asn Ile Glu Ser Gly Lys Gly Lys Ile Trp Trp
        1155                1160                1165
Asn Ile Arg Lys Thr Cys Tyr Lys Ile Val Glu His Ser Trp Phe Glu
    1170                1175                1180
Ser Phe Ile Val Leu Met Ile Leu Leu Ser Ser Gly Ala Leu Ala Phe
1185                1190                1195                1200
Glu Asp Ile Tyr Ile Glu Arg Lys Lys Thr Ile Lys Ile Ile Leu Glu
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Tyr Ala Asp Lys Ile Phe Thr Tyr Ile Phe Ile Leu Glu Met Leu Leu
            1220                1225                1230
Lys Trp Ile Ala Tyr Gly Tyr Lys Thr Tyr Phe Thr Asn Ala Trp Cys
        1235                1240                1245
Trp Leu Asp Phe Leu Ile Val Asp Val Ser Leu Val Thr Leu Val Ala
    1250                1255                1260
Asn Thr Leu Gly Tyr Ser Asp Leu Gly Pro Ile Lys Ser Leu Arg Thr
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Leu Arg Ala Leu Arg Pro Leu Arg Ala Leu Ser Arg Phe Glu Gly Met
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Val Leu Leu Val Cys Leu Ile Phe Trp Leu Ile Phe Ser Ile Met Gly
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Val Asn Leu Phe Ala Gly Lys Phe Tyr Glu Cys Ile Asn Thr Thr Asp
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Gly Ser Arg Phe Pro Ala Ser Gln Val Pro Asn Arg Ser Glu Cys Phe
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Ala Leu Met Asn Val Ser Gln Asn Val Arg Trp Lys Asn Leu Lys Val
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Asn Phe Asp Asn Val Gly Leu Gly Tyr Leu Ser Leu Leu Gln Val Ala
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Thr Phe Lys Gly Trp Thr Ile Ile Met Tyr Ala Ala Val Asp Ser Val
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Asn Val Asp Lys Gln Pro Lys Tyr Glu Tyr Ser Leu Tyr Met Tyr Ile
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Tyr Phe Val Val Phe Ile Ile Phe Gly Ser Phe Phe Thr Leu Asn Leu
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Phe Ile Gly Val Ile Ile Asp Asn Phe Asn Gln Gln Lys Lys Lys Leu
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Gly Gly Gln Asp Ile Phe Met Thr Glu Glu Gln Lys Lys Tyr Tyr Asn
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Ala Met Lys Lys Leu Gly Ser Lys Lys Pro Gln Lys Pro Ile Pro Arg
        1475                1480                1485
Pro Gly Asn Lys Ile Gln Gly Cys Ile Phe Asp Leu Val Thr Asn Gln
    1490                1495                1500
Ala Phe Asp Ile Ser Ile Met Val Leu Ile Cys Leu Asn Met Val Thr
1505                1510                1515                1520
Met Met Val Glu Lys Glu Gly Gln Ser Gln His Met Thr Glu Val Leu
                1525                1530                1535
Tyr Trp Ile Asn Val Val Phe Ile Ile Leu Phe Thr Gly Glu Cys Val
            1540                1545                1550
Leu Lys Leu Ile Ser Leu Arg His Tyr Tyr Phe Thr Val Gly Trp Asn
        1555                1560                1565
Ile Phe Asp Phe Val Val Val Ile Ile Ser Ile Val Gly Met Phe Leu
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Ala Asp Leu Ile Glu Thr Tyr Phe Val Ser Pro Thr Leu Phe Arg Val
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Ile Arg Leu Ala Arg Ile Gly Arg Ile Leu Arg Leu Val Lys Gly Ala
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Lys Gly Ile Arg Thr Leu Leu Phe Ala Leu Met Met Ser Leu Pro Ala
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Leu Phe Asn Ile Gly Leu Leu Leu Phe Leu Val Met Phe Ile Tyr Ala
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Ile Phe Gly Met Ser Asn Phe Ala Tyr Val Lys Lys Glu Asp Gly Ile
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Leu Asn Ser Lys Pro Pro Asp Cys Asp Pro Lys Lys Val His Pro Gly
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Phe Val Ser Tyr Ile Ile Ile Ser Phe Leu Val Val Val Asn Met Tyr
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Lys Phe Asp Pro Asp Ala Thr Gln Phe Ile Glu Phe Ser Lys Leu Ser
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Asp Phe Ala Ala Ala Leu Asp Pro Pro Leu Leu Ile Ala Lys Pro Asn
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Lys Val Gln Leu Ile Ala Met Asp Leu Pro Met Val Ser Gly Asp Arg
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Met Ser Ala Asn Pro Ser Lys Val Ser Tyr Glu Pro Ile Thr Thr Thr
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Leu Lys Arg Lys Gln Glu Asp Val Ser Ala Thr Val Ile Gln Arg Ala
        1875                1880                1885
Tyr Arg Arg Tyr Arg Leu Arg Gln Asn Val Lys Asn Ile Ser Ser Ile
    1890                1895                1900
Tyr Ile Lys Asp Gly Asp Arg Asp Asp Asp Leu Leu Asn Lys Lys Asp
1905                1910                1915                1920
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                1925                1930                1935
Ala Thr Ser Ser Thr Thr Ser Pro Pro Ser Tyr Asp Ser Val Thr Lys
            1940                1945                1950
Pro Asp Lys Glu Lys Tyr Glu Gln Asp Arg Thr Glu Lys Glu Asp Lys
        1955                1960                1965
Gly Lys Asp Ser Lys Glu Ser Lys Lys
    1970                1975
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